The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XIII. No. 325 SEPTEMBER 5, 1925 Prepaid Annual Subscription: United Kingdom, £1.1.0; Abroad, £1.4.0.

Contents

	PAGE
EDITORIAL: Our Chemical Police; Lying Low in Germany; "A Start in National Chemical Research"; Tests for Carbon Monoxide; B.D.C. New Products	241
The British Association Meeting at Southampton	244
Indian Chemical Notes; Boots for Chemical Works	249
Wembley Revisited; Fertilisers from Fish Waste	250
Work of the Government Chemist	251
From Week to Week	252
References to Current Literature	253
Patents Literature	254
Market Reports	257
Company News; New Chemical Trade Marks; Chemical Trade Inquiries; Tariff Changes	262
Commercial Intelligence; New Companies Registered	264

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders and Postal Orders should be made payable to Benn Brothers, Ltd.

Editorial and General Offices—8, Bouverie St., London, E.C.4.

Telegrams: "Allangas, Fleet, London." Telephone: City 9852 (6 lines).

Our Chemical Police

THE report of the Government Chemist on the work of the Government Laboratory during the past year shows the enormous amount of work the analysis of foodstuffs, beverages, etc., involves, and the extent to which the public depend on this service for protection against fraud, and even against worse consequences of adulteration and impurity. Some idea of the extent of the work may be gathered from the fact that the number of samples examined during the year was 448,106, an increase of 57,685 on the previous year. So many articles of food and drink, as well as other substances used in the home or in industry, are now sold in an artificial or highly "prepared" state that but for the help of the chemical police in arresting fraudulent and dangerous substances there is no knowing what undesirable additions we might be unintentionally absorbing at the domestic table or the club bar. Even now, we imagine, many things get through the mesh without being detected, but the fact that so many sorts are liable to summary arrest and conviction by the Government Chemist serves as a wholesome deterrent to the potential offender and a safeguard to the consumer.

The report covers much the usual ground, and is as interesting as always in its treatment of familiar articles of consumption and use. In some cases one comes across new matter. Attention, for example, has latterly been directed to the potassium chloride long known to be present in considerable quantity in the water of the Dead Sea, and several methods for its recovery have been proposed from time to time. A large scale experiment, we now learn, was undertaken in the Government Laboratory to ascertain the conditions under which the recovery of potassium chloride is feasible when solar heat alone is used, and a report on the matter has been submitted to a departmental committee. The consumption of beer appears to be still attended by some possible danger of arsenical poisoning, but the risk, judging by the number of samples tested, is too slight, we fear, to have any appreciable effect on a national habit. We have always been led to regard cocoa manufacturers as being very good people, but the report discloses the fact that several have been constrained—a most polite word for the offence—to use a substitute for natural cocoa butter, the detection and estimation of which present great difficulties. It is satisfactory to learn that the Government Chemist has devised a method equal to the needs.

Customs regulations account for a large part of the department's duties. Under the head of "Dyestuffs," 535 samples of imported colours, lakes and other goods were examined to ascertain whether they involved liability to Customs Duty or contained synthetic organic dyes or intermediate products, the importation of which is prohibited except under licence. In connection, again, with Part I of the Safeguarding of Industries Act, relating to Key Industry Duty, 9,433 samples were examined, in addition to 535 samples examined both for dyes and liability to Key Industry Duty. All this ruthless activity, we imagine, must often be annoying to manufacturers and dealers, but only so can the humble private citizen be assured that, approximately at least, he is getting what he pays for.

Lying Low in Germany

THE trend of events in the chemical industry in Germany at the present time, particularly so far as the large representative undertakings are concerned, provides interesting material for reflection and speculation. The ramifications of these undertakings, and more especially those which represent the constituent members of the German Dye Cartel, are difficult to follow out in detail, owing to their diversity; but, whether or not there is any justification for it,

an impression, in fact almost a suspicion, is spreading that developments and changes of policy are in progress concerning which there is a mysterious reticence on the part of the interests responsible.

We have already drawn attention to announcements made on good authority in the German Press, which have later been repudiated, and in connection with the methanol situation and the Bergius process in particular, it has been extremely difficult to form a clear view of what exactly is happening from the contradictory information which has found its way into print. It is only recently that the annual reports of the various firms constituting the Cartel have become available, and the general impression they give is that stockholders might just as well have been without them for the information they convey. One important point does, however, seem to emerge beyond any question, for there is little attempt made to conceal the fact that the future of the trust is by no means encouraging, mainly on account of the foreign competition in dyes and the general imposition of tariffs by those countries in which the industry has been newly established.

There can be little doubt that the German undertakings are fully alive to the uncertainty of the outlook so far as the dye situation is concerned, and there is every indication that in an attempt to maintain their revenue, they are making feverish efforts to shift their activities to other products and to increase their hold on the markets for fertilisers, methanol, liquid fuels, and pharmaceuticals. In this respect, it is worth while noting that during the past year the sales of fertilisers in Germany showed an enormous increase, which promises a great future for synthetic nitrates, while the Bayer Company reported excellent business in pharmaceuticals, in which, of course, it specialises. As things stand at the moment, the only possible construction which can be placed upon the rumours and reports is that those responsible for these great interests have seen where compensating markets are to be found, and are not too eager to give possible rivals the most accurate information as to their plans for capturing them. To these speculations one plain fact may be appended. An application to the Badische Co. the other day for definite information to clear up the conflicting reports from Berlin met with the polite reply that the company had no statement to make on the subject of their oil processes. Following upon the full and picturesque descriptions of their successes in this field contained in recent German dispatches to British newspapers, this severe reticence seems a little significant.

A Start in National Chemical Research

In spite of the unavoidable checks and delays associated with most building enterprises nowadays, there are good prospects that Professor G. T. Morgan, late of Birmingham University, will be able, within a few weeks' time, to make a definite start with his work as Director of the new National Chemical Research Laboratory at Teddington. The new department, as we have previously explained, is an experiment, and while there is every reason to hope it may very quickly justify itself and ultimately develop into an essential scientific service, the authorities have prudently decided to start in a small way and gradually build on acquired experience. The laboratories in which Professor Morgan's work will begin are simple and inexpensive structures, but they are so planned as to permit of easy extension, and to form part of a dignified complete design, which will be carried out as the work demands and as funds allow. A small but efficient staff is being got together.

The scope of the work, like several other features, must be determined by experience. At the moment there are several problems, arising out of the various Government services, awaiting investigation, and these will supply plenty of work for the research staff at the outset. Gradually, it is thought, it will become the habit for Government departments faced with chemical problems needing intensive research to pass them over as a matter of course to the central research staff at Teddington, and in that way new information will be centralised and become available in a way that is impossible while research is going on in a fragmentary way in isolated branches. Another field that is expected to yield many suitable and profitable subjects for study is industrial research. The existing industrial research associations are doing excellent work mainly in applied chemistry, but often points must arise of a more fundamental character which it would be desirable to be able to hand over to experts specially trained for pure research. In addition, we believe, the larger industrial concerns, which already have private research services, will welcome the opportunity of consulting with a National Chemical Research Laboratory concerning problems rather beyond the capacity of their own staffs, and of referring to it points of difficulty that arise from time to time. There must be in the national industries into which science enters an immense number of questions which are well worth investigation, but which fall a little outside the purview of a private research staff concerned mainly with industrial problems arising out of the works to which it is attached. It is, we believe, the desire of the new laboratory to encourage the exchange of ideas and suggestions on all such matters, and if this habit develops there should be here a very large and useful field of work.

The new National Chemical Research Laboratory is, as we have said, an experiment. It is early yet to speculate on what it may ultimately become. It may, however, confidently be said that it has been well planned, and that it starts with the advantage of thoroughly capable scientific and technical direction. As it justifies itself, we may expect to see the very limited funds at present available gradually increased. For the latter purpose, it will be necessary to educate the public in the value and necessity for chemical research, and a modest but judicious information service might be a help in this direction. The various American bureaux get their large grants-in-aid mainly through creating public sympathy with and knowledge of their work, and welcoming every opportunity of emphasising the fact that they exist to serve the public. The purely scientific work of the new Chemical Laboratory need not suffer or be unduly vulgarised by a little worldly wisdom of the same kind.

Tests for Carbon Monoxide

THE value of the pyrotannic acid method for the quantitative determination of carbon monoxide in blood and in air, by means of which the presence of the poison may be detected much more quickly than by methods previously used, is once more emphasised by the U.S.A. Bureau of Mines, which has been for some time experimenting on the subject. The only infallible diagnosis of carbon monoxide poisoning, the Bureau claims, is made by examination of the blood for carbon monoxide hæmoglobin, the compound which the gas forms with the colouring matter of the blood. Through the formation of this compound the hæmoglobin becomes ineffective as an oxygen carrier. A mere qualitative examination for this compound will indicate whether or not carbon monoxide is present, but in view of the importance of knowing whether or not carbon monoxide is the primary cause of the condition of the patient, it is necessary to make a quantitative determination of the carbon monoxide hæmoglobin present. Methods had previously been devised for the quantitative analysis of carbon monoxide when present in blood or in air in quantities large enough to affect the health and safety of a person. Some of them were suitable as to accuracy, yet all had some disadvantages in that they required either elaborate and expensive apparatus, or called for special technique and training on the part of the analyst, or were too delicate or too cumbersome for field use.

The Bureau of Mines, in its investigation of many cases of industrial and domestic poisoning from carbon monoxide, found it necessary to develop a method and apparatus which could be immediately taken to the scene of a poisoning, and which would give accurate results as to the carbon monoxide in the blood or in the air. This method—known as the pyrotannic acid method—has been used frequently during the past two years in the investigation of fatal and non-fatal cases of poisoning from gas stoves, automobile exhaust gases, and blast-furnace gas, as well as in the analysis of air in vehicular tunnels and in mines after blasting, and during rescue operations after a mine explosion. It has been used in the laboratory for experimental investigation of carbon monoxide poisoning of men and animals, and has also been used with success by other investigators and by corporations both in America and in other countries. In all of this work, it is definitely stated, the method has been found to be reliable and accurate, and admirably fulfils the requirements for the examination of blood and air. Its simplicity and ease of operation make it well suited to the needs of hospitals, industrial surgeons, safety engineers, coroners, departments of public safety, boards of health, and similar organisations. Details of the pyrotannic acid method are given in Technical Paper 373, copies of which may be obtained from the Bureau of Mines, Department of Commerce, Washington, D.C.

B.D.C. New Products

THE latest publications of the British Dyestuffs Corporation include an attractive pattern card illustrating the application of their Duranol, Dispersol, and Ionamine colours to acetate silk. The Duranol dyes (Orange G, Red G, Red 2B, Violet 2R, and Blue G) are all direct dyeing colours in paste form, applied in the simplest possible manner, and requiring no after treatment. Where the colours are applied singly the effects on acetate silk yarn are brilliant, the mixing of two or more colours results in many soft and rich shades. The Ionamine colours are distinguished from the Duranols by being soluble in water. Their fastness properties in general are described as "very satisfactory," and although they do not show the same high resistance to light as do the Duranol colours, they are said to satisfy the majority of requirements in this respect. Some members of the series are of interest as regards their direct shades only, others as regards the shades obtained by diazotisation and development on fibre, others, again, for both their direct and their developed shades. Of the Dispersol range only one example is given, Yellow 3G, a direct very bright greenish yellow in paste form. Although not equal to the Duranol standard in fastness to light it is sufficiently fast for most normal requirements, is applied in the same way, and is especially distinguished from many other colours of yellow shade by its non-phototropic properties. The remaining sample in the present collection is Chromazol Violet MV, a member of the Leuco Gallocyanine series, and one of the most widely used mordant calico printing colours. Shown in different strengths on fine calico, the bluish violet shades look extremely delicate. In addition to these dyes, the B.D.C. list of fine organic chemicals for research work, indicators, microscopic stains, medicinal and photographic chemicals indicates the very wide range of production now undertaken.

Points from Our News Pages

The British Association at Southampton—Professor C. H. Desch on "The Chemistry of Solids."—Papers on corrosion-resisting chromium, ignition of gases, preparation and purification of insulin (p. 244).

Vegetable oil investigation, leather research, and coal-cleaning processes are all receiving attention in India (p. 249).

A comparison of the Wembley Exhibition in 1924 and 1925 provides interesting conclusions (p. 250.)

While B. Laporte, Ltd., have presented a satisfactory report and are to augment their capital (p. 261) another important chemical concern is forced to close down (p. 256.)

The London market is without feature, but on the whole the uptake of chemicals shows a tendency to improve. Export trade is slack (p. 257.)

Heavy chemicals are moderately active in the Scottish market and inquiry is good (p. 260.)

Books Received

REPORT OF THE GOVERNMENT CHEMIST UPON THE WORK OF THE GOVERNMENT LABORATORY FOR THE YEAR ENDING MARCH 31, 1925. London: H.M. Stationery Office. Pp. 36. 1s. 6d.

DURANOL, DISPERSOL AND IONAMINE COLOURS ON ACETATE SILK—PATTERN CARD. Manchester: British Dyestuffs Corporation, Ltd.

PRICE LIST OF FINE ORGANIC CHEMICALS. Manchester: British Dyestuffs Corporation, Ltd.

DIE ALLGEMEINHEIT DES KOLLOIDJUSTANDER. By Prof. Dr. P. P. von Weimarn. Dresden and Leipzig: Theodor Steinkopff. Pp. 504. 25 marks.

The Calendar

Sept 12	Mining Institute of Scotland: General Meeting.	Newbattle Colliery, Newtongrange.
Oct. 4	Société de Chimie Industrielle: Fifth Annual Congress.	Paris.
Oct. 23	Engineers Club: Annual Dinner.	Savoy Hotel, London.

The British Association

Important Chemical Programme at Southampton

We give below reports of some of the papers presented at the British Association meeting which are of chemical interest. The Association met at Southampton from August 26 to September 2. The Presidential address in the Chemistry Section was delivered by Professor C. H. Desch on "The Chemistry of Solids," a report of which appears on page 17 of the Metallurgical Supplement of this issue.

THE annual meeting of the British Association for the Advancement of Science opened at Southampton on Wednesday, August 26 (see THE CHEMICAL AGE, August 29).

On Thursday the Chemistry Section opened its proceedings with a discussion on Surface Catalysis. Professor C. H. Desch, F.R.S. (President of the Section), was in the chair.

Surface Catalysis

Dr. E. K. RIDEAL, speaking of the influence of surfaces in chemical reactions, reviewed the position as it is known to-day and indicated possible future developments.

We were now entering, he said, upon the stage when catalytic methods were beginning to be applied to the simpler organic compounds, and the whole of the raw materials of industry would eventually be determined by the application of the principles laid down by the original work of Turner and Michael Faraday. Within the last 10 years we had seen the development of synthetic methyl alcohol which was based on the simple process of the interaction of carbon and water to give hydrogen and CO, and a subsequent interaction of hydrogen and CO to give methyl alcohol. Under ordinary conditions these two interactions, which appeared to be very simple, took place at extremely slow speeds, but by the influence of catalysts the molecules could be made to unite at very high speeds, and so the speed of the reaction was considerably increased. The question of the further conversion of CO with water to give pure hydrogen and CO_2, in other words, the complete conversion of coke into hydrogen, was one which at present had not been industrially determined, but it held great promise for the future. The further development of the second reaction, the interaction of hydrogen and CO_2, had been partly solved in Germany and France by the use of zinc oxide for chromium oxide to produce these reactions. This use of zinc oxide or chromium oxide to unite these two compounds was an extremely interesting result of the application of modern catalytic methods, but a further development was to use metallic iron and caustic soda. Then, instead of producing methyl alcohol, we should be able to produce the whole series of higher alcohols and esters, as well as hydrocarbons. In that way we should be able to produce a reasonably available liquid motor fuel from coke. This process had not yet arrived at technical success, which, of course, meant economic success. It was fairly certain, however, that synthetic motor fuel would arrive very shortly.

In addition to using coke as a raw material, there were indications that a partial solution of the coal problem might be found in the application of catalytic methods. It was known that the theoretical solution of the coal problem for England lay in some form of low temperature carbonisation. The great disadvantage of this method was that it took place very slowly, but attempts were being made, by the application of catalytic methods, to overcome that difficulty. One of them was based upon the formation of hydrogen from coke, a process which was being worked at by Bergius and his colleagues. In this, use was made of catalysts to hasten the reaction. Then there was another method of attack, viz., the addition of suitable peptising agents to coal, which gave us a liquid in the form of a heavy oil, containing coal in colloidal suspension, and, for certain purposes, this enabled distribution to be carried out more readily and economically than in the case of briquettes. On the other side of the question, oxidation processes were being investigated for the purpose of forming methyl alcohol from methane. In this country, however, with our limited supplies of methane, these processes had not developed on the practical scale, but in America and Canada such processes were being developed and the manufacture of formaldehyde was being carried on as the result.

Dealing with some of the fundamental problems underlying surface catalysis, Dr. Rideal said that although adsorption at surfaces might result in the formation of multi-molecular films, the adsorption of the first layer was attended with a much greater increase in free energy, and it was in this film that chemical reaction at surfaces took place. Only a small fraction of a surface was catalytically active. Both by the method of calculation of the number of effective impacts as well as by the method of selective poisoning could the extent of the active surface be determined. In this way it had been shown that only 0·01 per cent. of a carefully prepared active nickel surface was effective in promoting the combination of ethylene and hydrogen. About 0·05 per cent. of the surface of active sugar charcoal was autoxidisable, and 40 per cent. could catalyse the oxidation of oxalic acid. Great improvements in catalytic efficiency were thus to be anticipated. The specific effect of promoters could be determined in this way—the active area of iron activated blood charcoal was over 20 times as active as the active area of sugar charcoal in promoting the oxidation of oxalic acid, although the activity per gram was 15, and per square cm. was only three times as great. The activation by alternate oxidation and reduction could be ascribed to an extension of the space lattice of the metal, but future work must decide whether active areas were distributed according to the laws of probability or were associated with definite atomic configurations. In addition, more information was required on the mechanism of activation.

Two Hypotheses

The present evidence is not sufficient to decide between the two hypotheses. In one, every molecule which struck the active patch with a kinetic energy in excess of a certain critical value could be regarded as undergoing reaction; in the other, adsorption might be regarded as a primary action, which was followed by activation, by collision, or possibly by collision and by radiation. In his view, the evidence was equally strong in favour of both these hypotheses, but how the energy of activation was derived had to be decided not only for the heterogeneous reaction, but also for the homogeneous reactions. The case for activation by collision was by no means so strong as was supposed in some quarters.

Mr. C. N. HINSHELWOOD said the simplest and most important examples of heterogeneous reactions—reactions which take place at the boundary of two phases—were those in which molecules from a gas or mixture of gases underwent chemical transformation in contact with the surface of a solid catalyst. The molecules were adsorbed on the surface of the solid; complex molecules in this boundary layer assumed a definite orientation, while simple molecules, like hydrogen and oxygen, were probably resolved into atoms—at any rate when adsorbed by metals. Hardy has recently emphasised that the boundary layer was the seat of intense electric fields. With reservations about a number of complication factors, it was generally accepted that the adsorbed layer of gas was usually one molecule in depth. In these uni-molecular layers at the interface the chemical change took place; the layer of molecules constituted a little homogeneous system of its own—two-dimensional instead of three—which must possess chemical properties quite different from those of the gas in bulk. The problem as to what happened there could be considered in terms of the solid surface of the catalyst and in terms of the adsorbed molecules themselves. Professor Taylor and his school had thrown much light on the first part of the problem, and introduced the idea that only limited regions of the surface might possess catalytic activity.

The author then dealt with a possible objection to the conclusion that the catalytic reactions are truly uni-molecular. If there were a complete layer of, say, nitrous oxide molecules on a surface, and reaction were determined by the impact of a second nitrous oxide molecule on one of these, then the reaction would be kinetically uni-molecular, but not essentially a process involving one molecule only. But there were very strong objections to such an hypothesis. The first was that it was nearly always found that when two molecules of different

kinds reacted on a surface, both must be adsorbed; it was not sufficient for one to be adsorbed and for the other to strike it. The evidence for this was that excess of one of the reactants was usually a poison. The second objection was that, if the proposed mechanism were correct, there was no reason why the reaction velocity should ever become independent of pressure as it did in certain examples. Thirdly, if there is one complete layer in all cases, it would be very surprising that the molecules did not interact among themselves in that layer rather than await the arrival of molecules from the gas phase.

Dr. W. G. PALMER described a new method for the study of adsorption films and showed a large number of curves of results he had obtained.

Professor H. B. DIXON said that when the Association last met in Southampton about 40 years ago he was secretary of Section B, and he read a paper in which he expressed the hope that people would work at simple cases of chemical action and especially the study of the reaction of gases in the simplest possible form. He was driving a very lonely furrow at that time, but he was pleased now to see so many people carrying on this work and studying it from new angles and with far better appliances and machinery than formerly existed. The reaction of CO and oxygen was the particular reaction he tried in the early days, but since then the work on adsorption and thin films had been carried a very long way. He had always felt that there must be some kind of physical chemical reaction whereby a complex was actually formed. There must be some kind of chemical attraction, and from this point of view he hoped that work such as Dr. Palmer's would be continued. He believed that the molecule on the surface was under strain and therefore more easily attacked by oxygen or whatever it might be. Catalytic reaction was surely brought about in that way.

Dr. R. E. SLADE asked Mr. Hinshelwood whether he considered that in all cases where catalytic reaction took place it was probable that each stage of the reaction on the surface took place with a decrease of energy, and whether in all cases in which heterogeneous catalysis took place this was fairly apparent—he thought it probably was so—from the heats of reaction.

Mr. HINSHELWOOD said that the activation process itself was one in which the molecule absorbed a lot of energy and probably, in terms of the Bohr theory, entered into a higher quantum state, but he hesitated to say that every stage of the reaction was exothermic in the chemical sense, although the heat of activation was reduced in the sense that the heat was lowered.

Chromium and Corrosion Resistance

Mr. E. A. OLLARD, in a paper on "Resistance to Corrosion of Electro-deposited Chromium," described two series of tests on chromium, one carried out in the laboratory and the other under service conditions by the Metropolitan Vickers Electrical Co., Ltd. With the advent of stainless steel, he said, a good deal of attention has been drawn to the non-tarnishable properties of chromium and chromium alloys, and it was suggested some time ago that if a suitable process for plating this metal could be obtained it might replace stainless steel in many technical and commercial uses. The chief properties that made chromium of interest were its hardness and its resistance to corrosion from the atmosphere and certain acids. It was, however, readily attacked by hydrochloric acid, and was also easily corroded when it formed the anode of an electrolytic circuit. A good deal of technical difficulty, however, was experienced in the early attempts to electro-plate chromium on to other metals. Chromium formed several oxides, and metals of this type were always difficult to deal with, as there was a tendency to deposit one of the lower oxides instead of the metal. Electrolysis of chromium salts, such as sulphates and chlorides, did not give very satisfactory results, and most of the work on chromium plating had been done with a chromic acid solution. From this solution, fairly satisfactory deposits had been obtained in the laboratory, but it had been difficult to apply the process commercially. It was only within the last few years that processes had been involved which had been satisfactory on an industrial scale.

The test pieces and other objects mentioned in the paper were plated by Dr. Liebreich's process, which was being used commercially in Germany and France. This process appeared to give quite satisfactory results. From time to time investigators who had succeeded in plating chromiums had claimed various properties for the material treated. Among these claims the most noteworthy was that chromium plated directly on to steel would prevent it from rusting. It was perhaps unfortunate that such claims should be made, as not infrequently, when it was found that they were not justified, the whole process was put on one side as being useless, whereas it might have many other important applications.

Properties of Chromium-Plated Material

The object of the work described in the paper was to investigate the properties of chromium-plated material and discover for what purpose it was specially suitable, and the investigation had chiefly taken the form of a comparison with other plating processes. Sufficient time had not yet elapsed for conclusive results to be obtained. Test pieces showed three types of failure. In the first the coatings were gradually and fairly evenly removed until finally the base metal was exposed, after which corrosion took place very rapidly; in the second the plating was originally either pitted or somewhat porous, and corrosion took place at a few local spots; in the third place the plating was thrown off from the metal underneath it, either because it did not adhere, or because the underlying metal was corroded through the pores of the outer one.

From the tests described, the author concluded that chromium plating was especially suitable in cases where an article was required to keep bright without cleaning. The chromium, being hard, took a very high polish, and in this condition it appeared to resist corrosion even better than in the unpolished state. Chromium, however, like nickel and many of the harder metals, was liable to be porous when deposited in thin coatings, and for this reason a single layer of such a coating did not form an efficient protection to an easily corrodible material such as steel. Chromium also, in spite of its position with regard to iron in the electro-chemical series, did not appear to protect it, owing, perhaps, to its becoming passive and, in this state, more electro-negative. The steel, therefore, was liable to be corroded through the pores of the plating, and would then throw it off, but this disadvantage could be almost entirely overcome.

The results of the tests seem to indicate that the most satisfactory plating for all-round purposes was the chromium plating made with nickel as an underlying metal. Steel, plated first with cadmium and then with chromium, appeared to stand very well against atmospheric corrosion, but the chromium had a very strong tendency to strip from the cadmium. Also, chromium plated on cadmium would not take a high polish.

While, therefore, chromium itself could not be recommended for rust-proofing steel, steel articles plated first with nickel and then with chromium, especially if a layer of copper was put in between, would stand atmospheric corrosion extremely well. Such articles also would stand the action of steam and resist abrasion better than other platings, and might therefore prove extremely useful in steam plants. The chromium seems to adhere to the nickel quite satisfactorily.

Certain important applications might be found for this process in industrial practice. The test made on the die-casting pin seemed to show that the process might have a big future in that industry, and it was by no means unlikely that platings of this description might find applications in chemical plant, etc. Chromium plating resisted nitric acid very satisfactorily, and also most organic acids.

Dr. D. J. MACNAUGHTON (Woolwich Arsenal Research Dept.) said that chromium had a very wide range of resistance to a considerable number of corroding agents, and chromium-plated steel should have very extensive applications. His own view was that the technique of chromium plating had not yet been sufficiently developed, and that when this was done there would be no need to use intermediate metals.

Dr. R. S. HUTTON (Director, Non-Ferrous Metals Research Association) expressed the hope that attention would be given to chromium plating from the point of view of its application in industry, and that efforts would not be concentrated on its use in connection with domestic articles. There were many uses for such a corrosion-resisting material in chemical works and otherwise, and he hoped its development in that direction would be pushed forward.

The Ignition of Gases

On Friday morning, August 28, there was a joint discussion by the Chemistry and Engineering Sections on "The Ignition of Gases," opened by Professor H. B. Dixon, F.R.S.

Professor DIXON gave a brief historical account of the work done in connection with the ignition of gases, and surveyed Bunsen's early work. In making experiments on the pressure produced in the explosion of hydrogen and oxygen, Bunsen came to two conclusions, which he (Professor Dixon) regarded as rather contradictory. The first was that when a mixture was exploded by a spark running through a little tube, about 4 in. long, and the spark was sent the whole way through, only one-third of the gas was able to combine; after a short interval it cooled and another one-third exploded, and finally the remaining one-third exploded. Thus, there were three successive partial combustions or explosions. Bunsen had no other evidence than the fact that the pressure he was able to record was just one-third of that which he had expected, theoretically, from the heat of combination of the hydrogen and oxygen and the supposed specific heats. Bunsen's second dictum was that the spread of the flame in an explosion was synchronous with complete combustion, so that one could not have a flame going through and leaving unburnt gas behind it. How Bunsen had reconciled that second statement with the first he had not indicated.

Photographs shown demonstrated that the flame went right through the mixture before it was visible, and Bunsen's dictum was totally wrong.

Professor Dixon then dealt with some experiments which have been made during the past three years for the Safety in Mines Research Board on the ignition of gases, and discussed adiabatic compression. Photographs of flames produced by this compression were shown, and these illustrated further that the ignition point was not the point at which the flame was visible, but was the point at which it began to self-heat rapidly and bring itself up to the actual combustion, when the flame was seen. Sometimes this was quite a gradual process.

Concentric Tube Experiments

Dealing with concentric tube experiments, the author said that when a stream of inflammable gas from a narrow central tube was made to enter an atmosphere of air or oxygen in a large cylinder, both gases being heated equally before meeting, the gas would ignite very rapidly (under 15 seconds) on escaping from the orifice, so long as the temperature was maintained above a crucial point. On allowing the furnace to cool sufficiently, an appreciable time interval occurred between the turning on of the gas and its ignition. This gradually increasing "lag" was noted until the gas failed to ignite in 10 or in 15 seconds. The cylinder was then slowly heated and a series of diminishing lags was recorded, until the gas ignited again in less than 0·5 seconds. An increase in pressure, as a rule, lowered the ignition point of gases, as indicated by theory; but in many cases, notably with hydrogen, a diminution of pressure down to one-tenth of an atmosphere caused a continuous lowering of the rapid ignition point. As to incipient combustion, most gases showed some visible signs of partial combustion before normal inflammation—notably methane. The only gases with which the experimenters had been able to stabilise the incipient flames were mixtures containing carbon disulphide or ether.

Professor W. T. DAVID referred to work at Leeds upon an apparatus in which spontaneous ignition temperatures of inflammable gaseous mixtures were determined by means of adiabatic compression produced by the flow of compressed air into a tube in which the inflammable mixtures were contained. Preliminary experiments with this apparatus showed that the spontaneous ignition temperature varied with the pressure. For a 26·5 per cent. mixture of methane and oxygen, the following results were obtained:

Initial pressure of mixture (atmospheres)	0·25	0·5	0·75	1·0
Minimum final pressure at which ignition took place (atmospheres)	10·25	13·2	15·75	21·0
Ignition temperature (deg. C.) ..	475	400	370	355

Thus, in mixtures of methane and oxygen, the ignition temperature was decreased as the pressure was increased.

Perhaps the most remarkable result obtained from the experiments was that different types of radiation produced the speeding up in the CH_4 and CO mixtures. The experiments suggested that some kind of temporary association between nitrogen and the combustible gas normally took place during explosion, which association tended to be inhibited when the combustible gas was stimulated by radiation.

Professor Bone has suggested that the nitrogen absorbed the peculiar radiation emitted by the CO during its burning to CO_2, and by acting as a storehouse for the energy emitted by the burning CO in some curious way damped down the rate of combustion. He himself, however, had one experiment which rather negatived that view. He took an explosion vessel, the interior surface of which was first silver-plated, and he afterwards used it with a black interior surface. Using identical mixtures of CO, oxygen, and nitrogen he found that the rate of combustion was considerably greater when using the polished interior than when using the black interior, and there was no doubt whatever that the radiation density was very much greater than in the black vessel. It seemed to him that if the view that nitrogen absorbed the radiation emitted by burning CO was correct, there should be a sharp explosion in the polished vessel, because the radiation density in the higher density mixture used by Professor Bone increased with the initial density.

Ignition in Closed Vessels

Dr. O. C. DE C. ELLIS said that when ignition of a combustible mixture occurred in a closed vessel, the rate at which the flame began to spread was compounded of the rate at which the ignition was communicated from layer to layer of the mixture, and the rate at which the mixture just about to be burned moved under the expansive force of the burning mixture. The first influence of the enclosure was on the direction of expansion of the burning gas, which was toward the more open space. The second effect, very marked in small vessels, was the production of a second phase of slower propagation, following the first rapid spread of the flame. The third effect, most marked in rich mixtures, took place among the flame products, and was noticeable as a glow, occupying the space where originally the flame passed during its first phase—i.e., it began near the point of ignition.

Mr. E. B. WOOD said that what little work he had done had been on the ignition in a petrol engine. He was particularly interested in the question of the lag, because he had found there was a period when nothing at all seemed to happen. The period in the case of the work he had done was about one-thousandth of a second with an engine speed of 1,000 to 2,000 r.p.m., but he rather suspected that the temperature both of the charge and of the hotspots might affect the time of the preliminary lag. He should imagine that the hot exhaust valve might give the infra red radiation which, it was suggested, speeded up the rate of combustion.

Dr. E. K. RIDEAL, referring to the tentative explanation of Professor David's results—viz., that there was an association of the original nitrogen with the original unburned reactant—suggested that there might be an alternative explanation, if Bone's view that the nitrogen could act as a reservoir of energy by the absorption of radiation was accepted. It was known fairly conclusively that the active nitrogen molecules must be activated to several definite stages and that there were several stages of active nitrogen corresponding to different quantum levels. Assume that the active nitrogen could communicate its energy to CO or hydrogen, as the case may be, by direct collision. Nitrogen molecules of a low state of excitation would not bring a hydrogen molecule, by collision, into its reactive state because the original hydrogen would not have sufficient energy, but supposing the nitrogen molecule was activated to such a degree that it would, by contact or collision with a hydrogen molecule, bring it very near to its reactive state? Perhaps the energy required to give reactive CO was produced in two ways, first, by the radiation that was being drawn in, and secondly, from the nitrogen molecules which had already been activated by the radiation given out in combustion a little beforehand.

Dr. A. C. G. EGERTON said that he was working with acetylene and oxygen, and it might be that nitrogen had a greater effect in relation to acetylene than to other gases.

Professor DIXON and Professor DAVID both made short replies.

The Chemistry of Solids

Presidential Address by Professor Desch

In his presidential address on "The Chemistry of Solids" (summarised in our Metallurgical Section this week), Professor Desch offered some introductory remarks on the relations of chemistry to the great body of science as a whole. Two tendencies, he said, were clearly visible, and were profoundly affecting methods of study and instruction, and also the direction of research. On the one hand, chemistry, like every other science, was being split up into a number of distinct specialisms, and workers were tempted or even compelled to confine themselves to a narrow field; on the other, the boundaries between the several sciences were becoming less definite, through the development of border sciences, which themselves became new specialisms. Physics had gone far to provide the required basis for chemistry, and each new advance in physics suggested new ideas in chemistry. Chemistry in its turn was providing a basis for biology, although more slowly than had been hoped. Great as had been the triumphs of organic synthesis and of investigations of the colloidal state, the chemical study of living organisms was still looking to chemistry for more help than it had yet received. It was in this field that the greatest advances in the near future were to be expected, as the importance of a sound chemical foundation for biological science is more clearly recognised.

Lack of Public Interest

Whether they looked at the serious publications dealing expressly with the progress of science or at the mass of popular articles in newspapers and periodicals, there was little public curiosity in regard to the advance of chemical science. A few of its applications, and those mainly concerned with warfare, attracted attention from time to time, although the progress of agricultural chemistry, the most important of all from a national point of view, was shamefully neglected, in spite of the admirable work at Rothamsted and elsewhere. The public interest in chemistry did not extend far beyond poison gases and dyes. The progress of pure chemistry and the development of chemical theory were only followed by a small body of specialists, engaged in teaching or research, and of students whom the present system of scholarships and degrees forced more and more to become specialists, even at a very early stage of their studies.

An unfortunate consequence of excessive and premature specialisation in the study of chemistry was the ignorance of many advanced students concerning the work of the great chemists of the past. When attention was mainly concentrated on the latest developments of some restricted branch of the science, the sense of historical perspective was lost, and too much weight given to what might be only a perfection of detail. Faraday and his contemporaries were far too little known to young graduates in chemistry. Some teachers of the subject adopted the admirable plan of giving an historical and biographical colouring to their teaching, so ensuring that their students understood something of the debt which the science of to-day owed to its great leaders of the past. The interest now being taken in the history of science generally, and the appearance of useful little manuals of the history of chemistry in particular were hopeful signs.

A Synthetic View of Science

Our universities still lacked a synthetic view of science as a whole, and there was little appearance of the general adoption of a philosophy of science which would bring about unity, but, if he might venture to express an opinion on such a controversial point, it was that scientific study and research, with its inevitable increasing subdivision, would become less satisfactory as a mental discipline unless connected by a broad synthetic survey of science as a whole. The older metaphysics having proved a broken reed, men of science here and there were building up a working philosophy of their own, and it was permissible to hope that investigators and philosophers together might, in due course, succeed in the construction of a synthesis in which the several sciences would be placed in due relation to one another, so that the minute field in which each investigator had of necessity to work would appear to him, not as a completely isolated region, but as a part of a great whole, the general outlines of which would be comprehended by every scientific worker.

Insulin—Its Production and Preparation

On Thursday, August 27, Professor J. J. R. MacLeod, F.R.S. (Toronto), in a paper on Carbohydrate Metabolism in Cold-Blooded Animals, in the Physiology Section, said that research had shown that fish must possess insulin, and this was secreted by special glands near the gall bladder. The pancreas, which was the source of insulin in mammals, did not produce it. Insulin could be prepared very easily from the principal islets of the fish, and in countries where the cleaning of fish was done on shore this should be a profitable source. The difficulties of collecting islets when the fish were gutted at sea were so great as to make this an unsuitable source of supply.

Dr. C. H. Best (Connaught Laboratories, Toronto), in a paper on The Preparation and Purification of Insulin, said that the problem of the preparation of insulin was one in which the Connaught Laboratories at the University of Toronto were continually occupied, since they were interested in supplying, as economically as possible, the Canadian demand. In certain cases a process which might give good results on a small scale could not be adapted advantageously to the production of large quantities. At the Connaught Laboratories they had continued to use acid alcohol extraction of the pancreas, the ammonium sulphate precipitation of the active material from the concentrated extract, and subsequent purification by means of repeated precipitations from slightly acid aqueous solution.

The Process

The author then described certain recent changes in the procedure, which had resulted in very definite improvement in yields. In early experiments, alcohol acidified with hydrochloric acid was found to give very satisfactory results, in so far as purity of product and yields of activity were concerned. Because of the difficulties encountered in the filtration of the pancreas-alcohol mixture, however, hydrochloric acid was not used. Good yields, in small scale experiments, had been reported by other workers who had used this acid. In recent experiments the filtration difficulty had been overcome by the simple expedient of making the extract very slightly alkaline before filtration. Ammonium hydroxide was used to neutralise the acid, and it was important to add enough alkali so that the mixture was just alkaline to litmus. If the solution was too acid, the ammonium sulphate precipitate might be very bulky, and thus interfere with subsequent processes. If too much alkali was added, troublesome frothing might occur during the concentration. Before the filtrate was concentrated, sulphuric acid was added in such amounts that the concentrate will have a pH of about 2. Scott and Dr. Best had found it advantageous to dissolve the ammonium sulphate precipitate in warm (35 to 45 deg. C.) acid alcohol. One litre of 50 per cent. alcohol containing 5 c.c. of 5N hydrochloric acid was usually sufficient to dissolve the 200 grms. of ammonium sulphate precipitate secured from 300 lb. of glands. When the precipitate had completely dissolved, 10 volumes of warm 95 per cent. alcohol were added. The solution was then neutralised by adding 5 c.c. of 5N sodium hydroxide. After the solution had cooled to room temperature, it was placed in a cold room (5 deg. C.) for two days, and the dark-coloured supernatant alcohol was then decanted off. This alcohol contained practically no potency. The precipitate was then dried in vacuo and afterwards dissolved in water. The precipitation of the active principal in pure form was then easily secured by adjusting the pH to 5.

As a result of the change from sulphuric acid to hydrochloric acid, the yield of active material had increased by 75 per cent. In the routine large-scale procedure over 2,700 units of finished product per kilo of pancreas had been obtained, and the author thought that the yields would be considerably better when operations were resumed.

Purification Methods

With regard to the purification of insulin, there was very little new material available. Protein material was contained in the best products obtained up to the present. Scott, of the Connaught Laboratories, used a large sample of insulin powder prepared by the method outlined. The iso-electric precipitate was treated with trichloracetic acid, which removed some inert material (mostly inorganic). The final precipitate was washed thoroughly with ether and dried in vacuo. One gram of the white powder contained 25,000 units of insulin, or 25 units to the milligram. The combustion analysis on this material gave

results similar to those obtained from protein. The nitrogen distribution, as determined by the method of Van Slyke, was essentially similar to that obtained from protein. Results of this type, obviously, did not prove that insulin was a protein, or that only one protein was present in the insulin solutions.

Dr. Best then referred to an interesting paper on this subject by Able and Geiling. These investigators had purified insulin by repeated precipitations by pyridine, and re-solution in dilute acetic acid. This precipitation and solution was repeated five or six times, the last precipitate being dried in an air current, and finely powdered. The material was then ground up in a mortar with a small quantity of 90 per cent. phenol. The active material dissolved in the phenol. The insulin was removed by the addition of ether, absolute alcohol, or much water to the phenolic solution. The two essential features of this purification—the precipitation of insulin by pyridine and the solution in phenol—were reported some time ago by Maloney and Findlay, of the Connaught Laboratories. By this procedure, Able and Geiling had obtained a product which contained 40 units per milligram. The work represented a definite advance in the purification of insulin.

Able and Geiling also referred to the instability of the sulphur of insulin. Numerous investigators had reported the presence of sulphur, and it had been noticed that products made with sulphuric acid appeared to contain more sulphur than those prepared with other acids. Able and Geiling believed that the amount of sulphur was proportional to the activity of the insulin solution. As they admitted, that sulphur might belong to a substance to which insulin was attached, but they believed it more probable that the sulphur belonged to the insulin itself.

Professor Baly on Photosynthesis

Professor E. C. C. Baly, F.R.S., in conjunction with F. M. Johnson, H. G. Littler, and Miss Edith Morrison, on Monday presented a paper on "Recent Work on Photosynthesis."

Three years ago preliminary results were published, and since certain criticisms had been made, but the only one of importance was a statement by Professor Porter of the University of California, who showed that as various sources of impurities were removed, the yield of formaldehyde from carbonic acid was decreased until, in the complete absence of all impurities, no trace of formaldehyde could be detected when light acted upon carbonic acid. It had now been proved that when light acted upon carbonic acid, an equilibrium was set up between the carbonic acid on the one side and sugars and oxygen on the other. When the solution of carbonic acid was illuminated, sugars could be shown to be present, but if the source of light was removed, the sugar entirely disappeared, no trace whatever being found. If the oxygen was removed from the equilibrium, hexose sugars were directly synthesised by the action of light on carbonic acid. That result explained the apparent contradiction observed by Porter.

Recent work lead to the belief that fructose was simultaneously synthesised, and that it underwent condensation to a polysaccharide. If these results were confirmed, it was obvious, said Professor Baly, that the photosynthesis in the laboratory followed a course analogous to that in the living plant. In the laboratory a substitute for the naturally occurring chlorophyll must be used. It was believed that such a substitute had now been found, with the result that yet another essential differentiation between the living plant and the laboratory had been removed. The original results had therefore, claimed the authors, been confirmed in all essential details.

A Refrigeration Query

Professor Baly said that when a plant or animal was killed, there must be two deaths: first, the sudden death of vital function, and second, the loss of high energy associated with that function. It was not possible to say, at present, how long it was before the second death supervened on the first, but it was legitimate to ask whether it supervened during protracted cold storage. Preservation of our food, by absence of fermentation, was gained by cold storage, but this would be worth nothing if the vitalising high energy of that food were found to disappear in preservation.

Sodium Salts from Silicic Acid Gel

Dr. J. B. Firth and Mr. H. A. Fells in an account of some work on modifications of form of sodium salts expressed from silicic acid gel during drying, stated that clear silicic acid gels produced by the addition of solutions of hydrochloric acid, nitric acid, hydrobromic acid, and hydriodic acid respectively—of strength about 3N—to pure sodium silicate solution—density 1·185—were slowly dried in a desiccator containing calcium chloride, and the desiccator evacuated. After a time the sodium salt was expressed from the gel and invariably appeared in a needle-like formation. The results obtained were as follows:—

Sodium Chloride.—Long clear needles; some solid but the majority in the form of fine capillaries. X-ray examination showed lines corresponding to the ordinary cubic crystal. The needles showed very weak birefringence under the microscope and an extinction approximately parallel to the length of the needle.

Sodium Bromide.—Clear needles showing high double refraction and under crossed Nichols, anistropic colours, with an extinction angle of 9 to 9 deg. Crystals appeared to be monoclinic, were very unstable, and became opaque owing to conversion in minute crystals of the normal rhombic form. A few needles showed capillary structure.

Sodium Nitrate.—Long clear needles, stable, and with an extinction angle of 41 deg. A few were capillary needles.

Sodium Iodide.—Needle-like formation but opaque. First three varieties showed strain structure under microscope.

Potassium Iodide.—Silicic acid gel containing 7 per cent. water was impregnated with potassium solution and then dried as before. After several days the salt appeared on the surface of the gel as fine silky hairs very much distorted. Within limits of the present experiments the salts took up a needle-like form which showed strong indication of strain. The salt solution in the gel was under considerable pressure and solidified as it exuded from the pores of the gel.

Heterocyclic Diazonium Salts

Professor Joseph Reilly and Mr. Denis Madden dealt with the subject of velocity of decomposition of heterocyclic diazonium salts. The authors' process consisted in heating in a thermostat a solution of the diazonium salt contained in a quartz tube, through which a current of air-free carbon dioxide prepared by Farmer's method was passing and collecting the nitrogen evolved over caustic potash. A condenser was interposed between the tube containing the solution and the water-jacketed azotometer. By the use of the stream of inert gas, it was possible to overcome the difficulties met with by earlier investigators. Thus, by means of a control experiment, the time necessary for the solution to acquire the temperature of the thermostat was determined. A thorough sweeping with carbon dioxide expelled the nitrogen formed during this time, so that the true starting-point could be determined.

They found that the diazonium chloride from 4-amino 1-phenyl 3-5 dimethylpyrazolene was of the order of six times the stability of o-nitro-aniline at 100 deg. C. That compound was not the most stable of heterocyclic diazonium salts—*e.g.*, 3-5 dimethyl pyrazole diazonium chloride), and further work on this substance was in progress.

Lactic Acid in Insulin Hypoglycaemia

In a short paper on this subject, Dr. Best said that the study of lactic acid in blood and other tissues occupied a very important place in insulin research at the present time, and he discussed briefly some experiments dealing with the lactic acid of dog's blood before and after injections of insulin, which lowered the blood sugar definitely, but did not induce hyperirritability or asthenia. In none of the experiments was there any significant change in the lactic acid.

Leeds Chosen for 1927 Meeting

An invitation to hold the annual meeting of the British Association in Leeds in 1927 has been accepted. The meeting next year will be held in Oxford under the Presidency of the Prince of Wales.

Indian Chemical Notes

[From Our Indian Correspondent.]

The Punjab Government some time ago appointed an oil expert to investigate the present position of the vegetable oil industry in the Province. He has now submitted an exhaustive report, and made a number of recommendations for the advancement of the industry. Punjab is a province of vast dimensions, producing annually about 205,000 tons of oil seeds, most of which are exported. The great defect to be found in the present state of the oil industry is the want of modern methods of pressing and extraction. The indigenous methods are of the most primitive type, and even in the case of the mills where the power driven presses are employed, the output per press is very low, because there happen to be very few trained men having a real knowledge of the industry. It is, therefore, recommended that with a view to giving expert advice to the existing mills and carrying out improvements in the processes, the Government should create a special branch attached to the Industries Department under the guidance of an expert. Further, it is proposed that a Government demonstration mill should be started for the purpose of demonstrating the methods of operating modern mill plant, the refining of oils, the manufacture of artificial butter, soap and glycerine, of giving a lead to the vegetable oil industry generally. The demonstration mill will in the beginning produce good quality crude oil and saleable cake, as the market has not yet been prepared for the reception and use of higher grades of oil. The mill is to be so designed that it will include eventually refining, deodorising, and soap-making plants.

Coal Cleaning Experiments

As a result of the coal cleaning experiments carried out by an officer of the Geological Survey Department, India, it has been ascertained that the froth flotation process is the only one of the coal-cleaning processes capable of application on a commercial scale to the treatment of Indian coals. Flotation can concentrate the better constituents, vitrain and clarain, and eliminate the higher-ash non-coking ones, durain and fusain. Flotation clean products from second class coking coals have given cokes of excellent quality, and one of the largest iron and steel works in India has expressed the opinion that they are as good as can be desired. In general the most inferior constituents of the Indian coals, although of fairly high ash content, have calorific values of 5,000 to 7,000 B.Th.U. For this reason, cleaning of the Indian coals cannot appreciably increase their calorific values, and unless the conditions are exceptionally favourable cleaning for briquetting will not be profitable.

Leather Industry Inquiry

The Government of Madras, in passing orders on the report of Leather Industry Inquiry Committee, express the view that instead of endeavouring for the present to produce fully finished leather for export in place of partially finished or half tans as at present, the most promising course is to concentrate on the present class of half-tanned leather, so as to produce it at a cheaper rate. It is also decided to improve the equipment of the Leather Trade Institute for the purpose of research, and to carry out experiments with a view to the manufacture of new kinds of half-tanned and finished leather not yet produced in India. As regards the development of the chrome leather industry, the demand in India for these finished leathers is so limited at present, and the prospects of a foreign demand so remote, that the Government think that the only thing advisable is slowly to establish comparatively smaller tanneries in suitable centres, for the production of the grades of leather which are in demand in the country. Experiments at present are in progress in the Institute for producing improved qualities of a kind of leather suitable for water buckets.

Chemical Products

There are good prospects for the use of sulphate of ammonia in sugar cane cultivation, especially in the province of Bihar and Orissa. Sulphate of ammonia is now available as a by-product in the coal and iron-working districts of Bihar and Bengal. The cheapness of this manure per unit of nitrogen is now better known. Experiments with this fertiliser have given striking results on a Government farm in Bihar.

The experiments in lac cultivation which have been in progress for some years past in the Punjab have given promising results, and the Government have decided to extend the cultivation. It is expected that Punjab will soon prove an important source of lac in India. The revenue possibilities to the Government also are good.

The output of saltpetre in Northern India during the last year showed a slight decline from 230,000 maunds in the previous year to 207,000 maunds in the past year. There is a growing demand for the partially refined article for manurial purposes, while for saltpetre of low refraction the demand is poor.

Glycerin Production in Madras

A recent official report on the industries of Madras says that a glycerin plant has now been installed in the Kerala Soap Institute, Calicut, which enables the factory to prepare 80 per cent. crude glycerin, but it had not been operated on a commercial scale before the close of last year. The question of finding a market for the crude glycerin produced has received attention, and provided that a ready sale can be obtained for it the cost of production of the soaps should be materially reduced. A causticising plant for the production of caustic soda from soda ash has also been installed, but the results obtained from it have not so far been very encouraging, since caustic soda can at the present level of prices be purchased at a cheaper rate than it is possible to manufacture the product from soda ash with the Institute plant. S. G. W.

Boots for Chemical Works

To Resist Oils, Acids, and Alkalis

There are few industries which, from the corrosion point of view, put a severer strain on plant, materials, and clothing than the chemical and allied industries, and any process which ensures longer wear is one to be encouraged. In several cases it is necessary to supply workmen with protective boots of a special kind, and even a slight increase in wearing power represents, in a large works, a financial item well worth consideration. In this case attention has been drawn lately to the "Bullseye" boots, provided by C. W. Randall and Co., London, who claim that their productions resist water, oils, petrol, acid, alkalis, etc., and that consequently their wearing period is considerably prolonged. As in most cases, this result was not arrived at without considerable trouble.

In 1908 a part of the company's works was commissioned to carry out experiments in connection with a new process for manufacturing boots. This ultimately resulted in a steam pressure cured boot being made; hitherto rubber boots had been cured by ordinary heat in a vulcaniser. The factory after completing these experiments produced a boot cured by live steam and pressure like a motor tyre. When this boot was made and put on the market, it was called the "Bullseye" or "Arrow" boot, and was at a price at least 30 per cent. higher than any other. For many months sales were practically nil, but at the end of a year the firm's experience was that every person who had had the boot once insisted on having it again, no matter at what price, as it was found that it would outwear several pairs of ordinary rubber boots. It was further found the boot was suitable to resist acids and oils as well as, to a large degree, gasolene or petrol. The boot also shows a remarkable resistance to electrical current; although no specified resistance is guaranteed, it has been found to resist in the leg 5,000 volts and in the sole 20,000 volts. In one experiment the leg of a boot broke at just over 10,000 volts and the sole actually resisted 20,000 volts. What few complaints are received relate, not to wear, but to exposure. Exposure to atmospheric conditions, sun and frost for example, has a much more damaging effect than wear.

The company handle four lower grades of boots than the "Bullseye," but although prior to 1908 they sold large quantities of these, to-day their sales of "Bullseye" are more than twice as much as the combined sales of all their other four grades of lower priced boots. They regard with some pride the fact that in 1914 they received a Navy contract for 25,000 pairs of these boots and were instructed by the Admiralty to return in six months' time for a further contract to replace those worn out, etc. At the end of the six months practically none were worn out and the Admiralty had no further contract to offer at that time. Later the firm got a repeat contract from the Admiralty, but this did not reach them until 1917, showing that the boots had probably worn on an average two years.

Wembley Revisited

A Chemical Criticism and Appreciation

"Is Wembley worth going to this year?" is a question that has been asked many times. This answer is undoubtedly "Yes." The differences in the arrangements of the exhibition as a whole have been described in detail already, and though it is the case that there are not so many exhibits as before, the remainder seem to gain by being better arranged and having more space. Many of the more popular buildings such as the Dominions are practically unchanged, while the changes in the general effects, such as the abolition of the more grotesque colour schemes, improved illuminations at night, and so on, are all to the good. The general impression on making a visit this year, after a number last year, is that the whole place is more restful and one is not bewildered by the seemingly unending number of things to be seen. There is less to see, but it is more interesting.

To turn to the exhibits in the Chemical Section, the same tendency towards thinning out and a consequent gain in effect may be noted. One misses some of the big firms—Fraser's engineering exhibit, and the British Drug Houses display—for example. The actual area occupied is the same as before, but the absence of some exhibits has allowed the inclusion of what was badly needed last year—a lounge, fitted out with easy chairs in which the visitor may recover from the inevitable Wembley weariness.

Objects of the Chemical Display

The organisers of the Chemical Section last year had a double object before them, or rather two phases of a single object. The main idea, of course, like that of the whole exhibition, was the increase of trade. This was to be done by the direct invitation of buyers to come and see the display and place their orders, and indirectly by showing the public what British chemistry is doing. It was a big idea and a very difficult one to achieve, for there is too great a gulf fixed between the knowledge of the technical commercial man and the ignorance of the man in the street on a subject like chemistry.

This year exhibitors could only hope for an advertisement, possibly expensive for the invididual, plus the increased goodwill resulting from a wider appreciation among the general public of what the industry as a whole is doing.

It is notoriously difficult to show the public how its daily comforts are absolutely dependent on the science of chemistry and the productions of industrial chemical firms. In fact, more than one leading chemist has said it is impossible, but the support given to the Chemical Section at Wembley this year shows that the majority of our manufacturers do not think so. They realise, doubtless, that it would be entirely to their advantage if the public more widely recognised their value to the community.

Improved Scientific Section

In this appeal to the public the Scientific Section arranged by the Association of British Chemical Manufacturers is probably the most successful. It is better arranged, and less crowded than it was last year. There are now several groups of exhibits illustrating the main branches of chemical industry. These deal with such subjects as salt in industry, showing how it and its products are used in soap making, bleaching, dyeing, the glazing of pottery, and so on. Other exhibits deal with town's gas, dye making, disinfectants, drugs, explosives, the chemistry of food, and fertilisers. The arrangement in groups in this way has resulted in something which can be followed by the average layman. Last year, excellent as the Scientific Section undoubtedly was, it was inclined to mystify and to make the brain reel.

New Commercial Features

Among the commercial exhibits that of the British Cyanides Co., Ltd., must have first place for novelty, as on its stand may be seen two processes displayed which have not previously been shown to the public. These are silica gel and a new synthetic resin of thiourea and formaldehyde, having a wide variety of uses. The silica gel is shown in connection with an ingenious plant for obtaining dry air for use in blast furnaces, which merits a fuller description than can be given here. The new resin is notable in being almost transparent, so that objects can be produced in white as well as colours. It has also remarkable non-conducting properties as regards heat and electricity, superior, it is claimed, to phenol-formaldehyde resins. This resin is being marketed by the Beetle Products Co.

Messrs. Albright and Wilson have a particularly interesting exhibit in a prominent position where a new method of preserving stonework with "silicon ester" is shown, and also an interesting process by which wood may be rendered fire-proof.

On the well-arranged stand of the Brunner-Mond group may be seen samples of British-made synthetic sulphate of ammonia, but one feels that full advantage has not been taken here of showing what British chemists are doing, and have done in this matter. The use of P.84 silicate of soda for stone preservation is also prominently shown.

The combined display of dyed fabrics by British dye makers is a step in the direction of interesting the public, but here again the impression is that, though it is a great improvement on exhibiting bottles of dyestuffs, the display would have been more successful if it had demonstrated the utility of dyes in everyday life rather than their decorative value alone.

As last year, it is not only in the Chemical Section that chemistry is represented. Nearby are the displays of various products for use in peace and war, made by Nobel Industries, while also quite close the Co-operative Wholesale Society have a working exhibit showing some of the processes in soap and candle making. In the Government Pavilion, too, there are thoroughly worthy exhibits, similar to last year's, by all the Government Departments associated with science, among which may be more particularly mentioned the Fuel Research Board exhibits of low-temperature carbonisation plant.

W-J.

Fertilisers from Fish Waste

Important Commercial Prospects in British Columbia

RECENT references in THE CHEMICAL AGE to the treatment of fish waste have aroused such interest that the following notes from a correspondent of *The Times Trade Supplement* are informative.

The reduction of fish waste and pilchards into fertilisers, oils, meal, and other commercial products for which there is a growing demand is likely to become an important industry on the British Columbian coast. For some years fish waste has been converted into soil fertilisers on this coast; but, although there are more than sixty salmon and herring canneries, the distances between them are so great that centralised reduction plants have not been feasible. At the beginning of this year, however, it became legal to utilise the abundant supply of pilchards for the manufacture of fertilisers, fish meal, and fish oil. Hitherto, they had been reserved for human food, but because of the quantity of oil they contain, they have never been popular as edible fish.

Pilchards are remarkably prolific, and are sometimes found in such numbers as to break the fishermen's nets. For some years there has been an agitation for the repeal of the law reserving pilchards for human food, and with the granting of this demand, half a dozen reduction plants and fertiliser manufacturing concerns have been started in connection with canneries on Vancouver Island, as well as one or two on the northern mainland coast of British Columbia.

Demand for Pilchard Oil

For the manufacture of paints, fine soaps, leather, medicines, automobile enamel, lubricants, and for the tempering of certain metals, there is a world-wide demand for pilchard oil; the better grades of the fish meal are used for cattle and poultry feed, and the lower grades for fertilising purposes.

In 1924, British Columbia produced 171,000 gallons of fish oil and 1,017 tons of meal. The oil sells at about 30 cents a gallon, so that its total value last year was $51,480. Of the meal, which sells at about $40 a ton, the aggregate value was $40,680. It may be assumed that, with the inclusion of pilchard, this year's output will be very much greater.

Along the whole Pacific Coast, mostly in the United States, there are 54 plants of this kind operating. Last year they produced 3,889,930 gallons of herring and sardine oil of a total value of $1,166,979, and 25,077 tons of fish meal valued at $1,033,080. The yield of meal is about one ton to every six tons of raw material, and of oil it is approximately 40 gallons to the ton.

Recently an inquiry was received from a large importer in Glasgow offering substantial backing for any reputable firm which could guarantee a large supply of fish meal and fertilisers at regular intervals.

Work of the Government Chemist

Report of the Year's Activities

THE Report of the Government Chemist upon the work of the Government Laboratory records a very considerable increase in the number of samples analysed, and it is noted that the Dangerous Drugs Act and the Dyestuffs (Import Regulation) Act still impose considerable work on the Department. The Report is divided into groups representing the various ministries and authorities worked for, and subdivisions are made of the different materials examined.

Of 71 samples of sheep dips, 10 were defective. Nine samples of proprietary road dressings were examined for harmful or toxic bodies.

In connection with the Colonial Office, reports on chemical training and experience of candidates for posts in the Colonies were made, and overseas chemists have visited the laboratory for conferences and training.

In connection with the potassium chloride deposits of the Dead Sea, a large scale experiment was undertaken in the laboratory to ascertain the conditions under which the recovery of the potassium chloride was possible by means of solar heat only. A report has been published on this research.

Chemical Stations Established

To avoid delay in the examination of samples chemical stations have been established at the more important seaports where Customs and Excise officers carry out the work after special training in the Government Laboratory.

Under the Dyestuffs (Import Regulation) Act 1920, 535 samples were examined to ascertain whether they involved Customs liability or contained synthetic organic dyes or intermediate products. Over 700 samples of wood and mineral naphtha were examined, and 135 samples of pyridine intended for use in the preparation of methylated spirits were examined. Only five samples were rejected. Attention was given to the possibility of making methylated spirits objectionable to the taste without affecting its efficiency, and pyridine was adopted as an additional denaturant for that purpose. In the 20 out of 253 cases where samples of imported fusel oil contained more than 15 per cent. proof spirit, the importers were allowed to reduce the amount to that figure as an alternative to paying the duty. Nine out of 64 samples of the British product exceeded the limit.

In connection with the Home Office lead glazes, enamels, paints, etc., were examined from the worker's health point of view. A substance offered as a means of decarbonising motor engines, which became the subject of a Police Court action, consisted of flour coloured with a little ultramarine. In the Post Office work was included an examination of paper, pigments, and gum for deleterious substances.

Corrosion Research

Investigations into corrosive effects of certain fluids and soils on lead sheathing for cables showed that most of the trouble was caused by electrolytic action. Cases of corrosion of leaden tanks used for oil storage were reported upon from Trinity House. Special lubricants for cars were found to be ordinary oils with a little graphite, the value of which, if any, could only be decided after long trials. Old mortars and plasters were examined, but provided no confirmation of the suggestion that the alkalis present had given added durability. Corrosion of iron pipes laid in magnesite flooring was due to the corrosive effects of the chlorides present. This, the Report states, is a common feature of the improper use of ordinary magnesium-oxychloride cement—a fact that should be more generally known.

The Government Chemist, Deputy Government Chemist, and members of the staff have served on numerous committees during the year.

The Report, which is admirably indexed and tabulated, is published by H.M. Stationery Office, price 1s. 6d. net.

"Nitrogenates"

A NEW word "Nitrogenates" is suggested by *Drug and Chemical Markets* (New York) as a suitable generic term to describe all types of nitrogenous fertiliser materials. "Nitrogenates" would include, for example, nitrate of soda, sulphate of ammonia, cyanamide urea, and all forms of combined and soluble nitrogen.

Gold from Mercury

WHAT appears to be increasing success in the effort of German science to transform mercury into gold is reported in Cothen advices to the American Chemical Society. In one year, these advices state, ten thousand times as much gold has been produced from the same quantity of mercury through the experiments carried on by Professors Miethe and Stammreich. Gold has also been obtained, it was said, at the Siemens works in Berlin by bombarding mercury surfaces with electrons in extremely high vacuum. The work of Miethe and Stammreich, it was stated, is dispelling the doubt that existed among eminent German chemists, among them Fritz Haber. Attempts to derive gold from mercury in the United States by the same methods, it is said, have failed.

If electrical discharges are passed between mercury electrodes in a dielectric, that is, paraffin, the gold is found only in the mercury atomised in the spark path and at concentrations of gold to mercury as one part to ten thousand, that is, from one kilogram of mercury is obtained 0·1 gram or 100 milligrams of gold. Up to the time of the first publications, says the report, Miethe had obtained one part of gold from 100,000,000 parts of mercury. Thus, in about a year success has been attained in increasing ten thousand fold the yield of gold from the same amount of mercury. Likewise in the laboratory of the Siemens Works in Berlin they have succeeded in obtaining gold after bombarding mercury surfaces with electrons in extremely high vacuum.

It is to be emphasised that all methods thus far applied permit practically complete recovery of the mercury so that the same quantity can be used repeatedly. The silver-like substance which often appears with the gold, or is formed almost exclusively, arises, according to Miethe, from the mercury. Professor Nagaoka has also obtained, together with gold, a second substance which he described as similar to platinum.

Casein Merchants' Voluntary Liquidation

A MEETING of the creditors of Rennacid Casein, Ltd., casein importers and exporters, 11, Poultry, London, E.C.2, was held on September 1. The liquidator in the voluntary liquidation submitted a statement which disclosed liabilities of £607 18s. The net assets were £298 7s. 8d., or a deficiency, so far as creditors were concerned, of £309 10s. 4d.

The company was registered on June 14, 1923, to carry on business as merchants in casein and similar products. During the first year a considerable turnover was shown, but since June, 1924, the sales had fallen off. The expenses of the business were reduced, but they could not be brought down sufficiently low to enable a profit to be earned. Since the company had gone into liquidation the landlord had distrained. During the first year's trading there was a net loss of £130. Subsequently the trade declined, and although the salaries were considerably reduced there was a further loss. It was also a submission that the market had been against the company. A resolution was unanimously passed confirming the appointment of Mr. Amsdon as the liquidator of the company.

Classes at the Sir John Cass Institute

THE session 1925-26 will commence on Monday, September 21, and students will be enrolled on September 16, 17, and 18 from 6 to 8.30 p.m.

Instruction is given in the following subjects: Pure and applied mathematics, physics, chemistry, fermentation industries, petroleum technology, gas manufacture and metallurgy. The courses of instruction are held from 6 to 10 p.m., and meet the requirements of those engaged in chemical, metallurgical, electrical, petroleum, and the fermentation industries. Full facilities are provided in the well-equipped laboratories of the Institute for special investigations and research. The instruction in experimental science also provides systematic courses for the examinations of London University, the City and Guilds of London Institute, and of the Institutes of Physics, Chemistry and Brewing.

Special courses of higher technological instruction form a distinctive feature of the work of the Institute. Full particulars are obtainable from the Secretary at Jewry Street, Aldgate, London, E.C.3.

From Week to Week

SIR WILLIAM ALEXANDER is on a month's tour in the United States.

PROFESSOR G. T. MORGAN is expected to take up his work at the National Chemical Research Laboratory at Teddington in about a fortnight's time.

FIRE BROKE OUT at the factory of Walter Carson and Sons paint manufacturers, of Lombard Road, Battersea, on Sunday. The whole of the top floor was destroyed.

MR. M. R. DAUGHTERS, formerly research chemist to the Polk Co., Florida, has become chief chemist and director of chemical research to the Sprague-Sells Corporation, Illinois.

MR. HOWARD WONTNER SMITH, assistant sewage engineer to Bradford Corporation, has been recommended by the Sewage Committee for appointment as city sewage engineer in succession to Mr. Joseph Garfield, who died last week.

REPORTS STATE that if the rumoured disposal of the Government holding in the British Dyestuffs Corporation materialises the shares will not be placed on the market, but a section of the Stock Exchange will be made for their disposal.

THE FIRST LABORATORY OF GLASS TECHNOLOGY in an American institution of higher education is to be erected as part of the new chemical laboratory at Pittsburg University and is provided for by a gift of $50,000 from Mr. I. W. Frank.

A GRANT OF £20,000 to assist the promotion of the British Industries Fair is reported to have been authorised by the Treasury at the request of the Board of Trade. The Fair will probably be held at White City, London, from February 15 to 26, 1926.

DAMAGE amounting to several thousand pounds was done by an outbreak of fire at the Neptune Mills Co., Ltd., Oban, on Saturday, August 29. The company manufactures feeding stuffs and fertilisers from seaweed, and valuable machinery was destroyed.

THE MANUFACTURE OF 100 PER CENT. SULPHURIC ACID will shortly be undertaken by the Nobel Dynamite Works at Brateslava, Czechoslovakia. The firm established a successful sugar refinery in 1924 and the sulphuric acid produced will be used in this connection.

SIR ALFRED AND LADY MOND have returned to England from the Continent. Sir Alfred has benefited greatly from his treatment and will resume his engagements next week. He will unveil the statue to the late Dr. Ludwig Mond, F.R.S., at Clydach on Saturday, September 12.

WHEN POURING A WEED KILLER into water the fluid splashed up into the mouth of a retired tradesman at Nuneaton. Only the smallest quantity of weed killer appeared to splash up, but in spite of a prompt emetic the man died shortly after, apparently from the strain of vomiting and heart failure.

ON SEPTEMBER 16 the land and buildings of the Phœnix Chemical Works, near Accrington, together with works plant for the manufacture of tartaric acid and cream of tartar, etc., will be sold by auction. Catalogues may be obtained from E. Rushton, Son and Kenyon, 13, Norfolk Street, Manchester.

A COURSE OF HOME STUDY on "Manufactured Gas" is now offered by Columbia University and endorsed by the American Gas Association. The course gives thorough instruction by correspondence of the technical side of gas manufacture, distribution, and utilisation, etc. Professor Jerome J. Morgan, of the Department of Chemical Engineering, is responsible for the course.

APPLICATIONS ARE INVITED for the following appointments, on or before the dates mentioned:—Two analysts for the building research station of the Department of Scientific and Industrial Research—The Secretary, Department of Scientific and Industrial Research, 16, Old Queen Street, S.W.1 (September 14). A junior assistant physicist at the building research station of the Department of Scientific and Industrial Research—The Secretary, Department of Scientific and Industrial Research, 16, Old Queen Street, S.W.1 (September 14). Graduates with practical knowledge of chemistry to act as growers' representatives at sugar beet factories for the forthcoming season (16 weeks) beginning October (salary, £5 per week)—General Secretary, National Farmers' Union, 45, Bedford Square, London, W.C.1.

LEAD PAINT POISONING in the vehicle building trade is dealt with in the new draft regulations issued by the Home Secretary on Monday. They provide that white lead, sulphate of lead, or products containing these materials shall not be used in painting operations, except in the form of paste or paint ready for use. Lead paint must be stored in receptacles legibly so marked, while its use is prohibited for spraying operations except in special compartments with an efficient exhaust draught to draw the spray away from the worker. Neither may lead paint be used for painting the interior of a roofed vehicle if the surface is to be rubbed down. Any surface so painted shall not be rubbed down or scraped by a dry process. The regulations also stipulate for adequate accommodation, washing facilities, and the use of overalls. Medical examination of workers when required is also provided for.

A NEW FACTORY for artificial silk production is to be erected near Manchester. A company is about to be formed with a capital of between three and four hundred thousand pounds.

DR. LINA STERN, formerly assistant to the professor of physiological chemistry at Geneva University, has been appointed to the chair of physiological chemistry at Moscow University.

DR. JOHN H. PERRY has resigned from the staff of the U.S. Bureau of Mines helium laboratory to take up a post as physical chemist in the chemical department of the Du Pont Co. at Wilmington.

MR. A. C. FIELDNER has been appointed chief chemist of the U.S. Bureau of Mines in place of Dr. S. C. Lind, who resigned in March. Mr. Fieldner will continue as superintendent of the bureau's experimental station at Pittsburgh.

THE NEW INDIAN PLANT of Courtaulds, Ltd., has commenced operations and will remove the necessity for exporting from this country artificial silk yarn ready for manufacture. Mr. Aspden is in charge of the concern, which is known as Courtaulds, Ltd. (India).

MR. T. D. COOPER has, owing to ill-health, resigned his position as managing director of the Val de Travers Asphalte Paving Co., Ltd., but retains his seat on the board. Mr. Arthur Findlay has been appointed general manager and Mr. C. M. Robertson assistant manager.

AN AGREED INCREASE in Manchester's gas prices is indirectly necessitated by a loss on by-products. The fact that Germany is now working in the Ruhr and producing her own pitch, etc., has made an appreciable difference, as much of Manchester's pitch went to that territory.

DR. WARREN K. LEWIS, head of the department of chemical engineering at the Massachusetts Institute of Technology, has been elected an honorary member of the British Institution of Chemical Engineers in recognition of his achievements in chemical engineering. From its inception the Institution has only elected five honorary members.

THE BERGIUS PROCESS for the extraction of oil from coal is to be used at a proposed factory in the Waldenburg district of Silesia. Dr. Gaertner, a prominent industrialist, is moving in the matter, and 20,000 tons of oil per annum is estimated for. The Prussian Government is giving financial credit to the scheme. Another factory is to be built in Westphalia for the same purpose.

IMPORTANT PROPERTIES ARE CLAIMED for a new disinfectant discovered by a Liverpool soap manufacturer. It is an oily fluid capable of use in a sprayer or atomiser. Experiments this week have shown that gnats and mosquitos were quickly killed by the spray, and tests were made at the Liverpool Corporation destructor and bone yards. Weevils and bluebottles were also destroyed to the satisfaction of the Corporation officials.

THE DEALERS IN CHEMICAL PRODUCTS at Buenos Aires have presented a petition to the National Minister of Finance drawing attention to the inconvenience to which they are subjected owing to the National Chemical Office's delay in analysing imported chemical goods. Under a recent decree all imported goods at Buenos Aires have to be analysed, and it is complained that owing to the inadequacy of the chemical staff serious delays occur, which frequently make it impossible to dispose of merchandise at the opportune moment, and result in a substantial increase in warehousing costs. The various chambers of commerce and other commercial organisations are urging the importance of increasing the chemical staff to proportions which will enable it to dispose of the analytical work in reasonable time.

Obituary

MR. JOHN MELVIN, of Newlands, Glasgow, head of the firm of John Melvin and Co., Ltd., margarine manufacturers, aged 64.

MR. WILLIAM HARVEY, aged 75, head of the firm of Harvey and Sons, Ltd., tanners and curriers, of Bury and Nantwich. Mr. Harvey established the business over fifty years ago.

DR. PERCY NORTON EVANS, professor of organic chemistry and director of the chemical laboratory at Purdue University since 1900. He was keenly interested in educational problems and had been a president of the Indiana Academy of Science.

MR. JOSEPH GARFIELD, sewage engineer to the Bradford Corporation, aged 53. Mr. Garfield took up his work at Bradford nearly 25 years ago, and it was mainly through him that the sewage problem of Bradford, which presented special difficulties on account of the large amount of trade grease from the wool-washing processes of the city, came to be surmounted. He not only made it possible after three years of experiment to extract the grease from the effluent, but also to purify and to market it. The Bradford sewage department for some years before the war was, in fact, able to show a profit, and in all about £1,000,000 has been received by the Corporation from the products made from sewage at the Esholt Estate. Mr. Garfield's services had been requested by Governments in connection with various investigations into precipitates and relative matters. He was for three years (1921–24) president of the Association of Sewage Disposal Managers.

References to Current Literature

British

PETROLEUM.—Colloids in petroleum and in the petroleum industry. A. E. Dunstan, F. B. Thole and W. H. Thomas. *J.S.C.I.*, August 28, 1925, pp. 439–443T.

NITROCELLULOSE.—Industrial nitrocellulose products. H. Hepworth. *Ind. Chem.*, August, 1925, pp. 323–325.

DRUGS.—The chemistry and chemotherapy of tropane derivatives. G. M. Dyson. *Ind. Chem.*, August, 1925, pp. 328–330.

*Iso*quinoline derivatives. Part IX. Preparation and reduction of *iso*quinoline and its derivatives. R. Forsyth, C. I. Kelly, and F. L. Pyman. *Chem. Soc. Trans.*, July, 1925, pp. 1659–1667.

Synthetical experiments in the *iso*quinoline group. Part V. Synthesis of substances allied to oxyberberine. R. D. Haworth, W. H. Perkin and H. S. Pink. *Chem. Soc. Trans.*, July, 1925, pp. 1709–1723.

PHENYLHYDRAZINE.—Bromination of acyl derivatives of phenylhydrazine. Preparation of 2 : 4-dibromphenylhydrazine. J. E. Humphries and J. R. Evans. *Chem. Soc. Trans.*, July, 1925, p. 1676.

The action of halogens on *m*- and *p*-nitrobenzaldehyde phenylhydrazones. F. D. Chattaway and A. J. Walker. *Chem. Soc. Trans.*, July, 1925, p. 1687.

CHLORINATION.—Researches on sulphuryl chloride. Part III. The influence of catalysts on the chlorination of toluene. O. Silberrad, C. A. Silberrad and B. Parke. *Chem. Soc. Trans.*, July, 1925, pp. 1724–1731.

WASTE LIQUIDS.—Distillery waste liquids and their purification. R. D. Littlefield. *J.S.C.I.*, August 28, 1925, pp. 860–867.

FATTY ACIDS.—The oxidation products of oleic acid. Part I. Conversion of oleic acid into dihydroxystearic acid and the determination of the higher saturated acids in mixed acids from natural sources. A. Lapworth and E. N. Mottram. *Chem. Soc. Trans.*, July, 1925, pp. 1628–1631.

ANALYSIS.—A simplified method of micro-combustion. The micro-Dennstedt method. C. Funk and S. Kon. *Chem. Soc. Trans.*, July, 1925, pp. 1754–1755.

Critical studies in methods of analysis. XVI. Zinc. L. A. Congdon, A. B. Guss and F. A. Winter. *Chem. News*, July 31, 1925, pp. 65–68, August 7, pp. 81–84, August 14, pp. 97–100, August 21, pp. 113–117.

CARBONISATION.—The rationale of coal carbonisation. The carbonising problem as it stands to-day. W. E. Davies. *Gas World*, August 22, 1925, pp. 157–162.

GAS.—Conditions affecting the activity of iron oxides in removing hydrogen sulphide from city gas. *Gas World*, August 8, 1925, pp. 115–121.

United States

SULPHITES.—The action of some oxidising agents on sulphites. W. S. Hendrixson. *J. Amer. Chem. Soc.*, August, 1925, pp. 2156–2159.

BROMINATION.—Studies of the directive influence of substituents in the benzene ring. II. The relative rates of bromination of certain ortho-, meta-, and para-isomers. A. W. Francis, A. J. Hill and J. Johnston. *J. Amer. Chem. Soc.*, August, 1925, pp. 2211–2231.

URIC ACID.—The action of alkali on substituted uric acids. II. 1 : 3 : 7-trimethyl-9-phenyluric acid. III. 1 : 3 : 7 : 9-tetramethyl- and 1 : 3 : 7-trimethyl-uric acids. E. S. Gatewood. *J. Amer. Chem. Soc.*, August, 1925, 2175–2188.

RUBBER.—The ultraviolet microscope in the study of vulcanised latex globules. H. Green. *J. Ind. Eng. Chem.*, August, 1925, p. 802.

POISONS.—Industrial poisoning by aromatic compounds. D. H. Killepper. *J. Ind. Eng. Chem.*, August, 1925, pp. 820–822.

Tetraethyl-lead poison hazards. T. Midgley. *J. Ind. Eng. Chem.*, August, 1925, pp. 827–829.

LEATHER.—Fixation of constituents of chrome liquors by hide substance from highly concentrated chrome solutions. K. H. Gustavson. *J. Ind. Eng. Chem.*, August, 1925, pp. 823–826.

Variation of strength and stretch over the area of calf leather. J. A. Wilson. *J. Ind. Eng. Chem.*, August, 1925, pp. 829–830.

SULPHITES.—The removal of sulphurous acid from grape syrup. W. V. Cruess and E. W. Berg. *J. Ind. Eng. Chem.*, August, 1925, pp. 849–850.

QUARTZ.—Elimination of surface devitrification on laboratory quartz ware. F. C. Vilbrandt. *J. Ind. Eng. Chem.*, August, 1925, pp. 835–837.

SOLUBILITY.—The solubility relations of isomeric organic compounds. II. The determination of freezing points of binary mixtures. D. H. Andrews, G. T. Kohman and J. Johnston. *J. Phys. Chem.*, August, 1925, pp. 914–925.

SOAP.—The nature of soap in alcoholic solutions. W. A. Patrick, W. L. Hyden and E. F. Milan. *J. Phys. Chem.*, August, 1925, pp. 1004–1008.

GELATINE.—The elasticity of gelatine in relation to hydrogen ion concentration and swelling. G. W. Scarth. *J. Phys. Chem.*, August, 1925, pp. 1009–1021.

French

ANALYSIS.—Contribution to rapid electrometric analysis. Separation by graduated potentials of lead, bismuth, antimony, copper, and tin. A. Lasseur. *Ann. Chim.*, May–June, 1925, pp. 269–324.

The colorimetric determination of hydrogen ion concentration. E. Richard. *Ann. Chim. Analyt.*, July, 1925, pp. 198–201.

PHYSICAL.—Freezing point curves for solutions of sodium nitrate in water. H. Helberg. *Ann. Chim.*, July–August, 1925, pp. 121–130.

The viscosity of acetic acid solutions. N. de Kolossowsky. *J. Chim. Phys.*, July, 1925, pp. 321–324.

HYDROCARBONS.—Researches on the preparation of acetylenic hydrocarbons. M. Bourguel. *Ann. Chim.*, May–June, 1925, pp. 325–389.

ALCOHOL.—The preparation of alcohol chemically. Part II. The preparation of alcohol starting from wood or from cellulose. E. Girod. *Rev. Chim. Ind.*, August, 1925, pp. 238–243.

BARIUM CHLORIDE.—Manufacture of barium chloride by the dry method. R. Hazard. *Rev. Chim. Ind.*, August, 1925, pp. 243–246.

COLLOIDS.—Activated sludge from the colloidal point of view. F. Dienert. *Rev. gen. des Colloides*, July, 1925, pp. 193–199.

CELLULOID.—The degeneration of celluloid and nitrocellulose collodions. M. A. Breguet. *Rev. gen. des Colloides*, July, 1925, pp. 200–206.

ACIDS.—The manufacture of sulphuric acid by the lead chamber process in recent years. Part V. De Jussieu. *L'Ind. Chim.*, July, 1925, pp. 290–293.

German

REACTIONS.—The reactions of nitrosyl chloride. I. Nitrosation and chlorination by means of nitrosyl chloride. H. Rheinboldt and O. S. Dumont. *Annalen*, July 23, 1925, pp. 113–134.

The addition of nitrogen oxides and of nitrosyl chloride to Δ'-dihydronaphthalene. F. Strauss and W. Ekhard. *Annalen*, July 23, 1925, pp. 146–164.

CATECHIN.—The conversion of cyanidin into catechin. K. Freudenberg, H. Fikentscher and O. Schmidt. *Annalen*, July 23, 1925, pp. 135–145.

CHROMIUM.—Contribution to the chemistry of bivalent chromium. W. Traube, E. Burmeister and R. Stahn. *Z. anorg. u. allg. Chem.*, August 17, 1925, pp. 50–67.

ANALYSIS.—Estimation of methyl and ethyl alcohols. J. Wimmer. *Z. angew. Chem.*, August 20, 1925, pp. 721–723.

The quantitative estimation of chlorine in benzaldehyde. J. D. Bukschnewski. *Z. angew. Chem.*, August 20 1925, pp. 723–724.

Standardisation of titanium trichloride solutions and the potentiometric estimation of copper. E. Zintl and A. Rauch. *Z. anorg. u. allg. Chem.*, August 12, 1925, pp. 281–288.

Patent Literature

Abstracts of Complete Specifications

237,659. Distilling Ammonia Liquor, Benzolised Oil for Washing Coal or Other Gases, Apparatus for. J. Barratt, 48, Queen Street, Redcar, Yorks, W. H. Greaves, 50, Sydenham Road, Stockton-on-Tees, Durham, and Ashmore, Benson, Pease and Co., Ltd., Parkfield Works, Stockton-on-Tees, Durham. Application date, May 6, 1924.

This apparatus is suitable for distilling crude ammonia liquor or benzolised oil, or for extracting ammonia, benzol, cyanides, naphthalene, etc., from coal or other gas. The apparatus is constructed of cast iron flanged plates E, F, and a series of cast iron trays H; the opposite sides F, may be

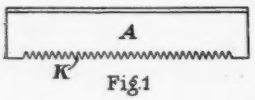


Fig.1

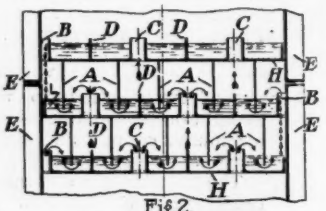


Fig.2.

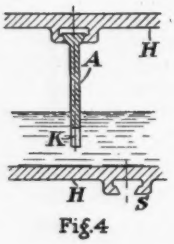


Fig.4

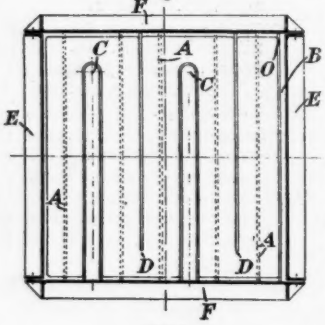


Fig.3.

237,659

removed for cleaning purposes. Thin plates A with the lower edge K serrated are secured to the under side of the trays H by means of grooves S, so that they may be removed for cleaning. The trays H are divided into troughs by gas uptakes C and dividing plates D. The arrangement of the uptakes C and dividing plates D is such that the liquid flows in a zigzag path along the troughs thus formed, passing under the serrations K at alternate ends. The liquid then overflows through the gas uptake B into the next tray in counter-current to the gas, which flows upwards through the apparatus. This apparatus gives prolonged contact between the vapour or gas and the liquid.

237,685. Alkali Celluloses, Preparation of. Courtaulds, Ltd., 19, Aldermanbury, City of London, and E. van Weyenbergh, 125, Elms Road, Clapham, London. Application date, May 30, 1924.

This process is for preparing alkali celluloses containing not less than 30 per cent. of caustic alkali, and not more than 35 per cent. of water. The cellulose is steeped for a short time in caustic alkali solution containing more than 50 per cent. of caustic alkali, at a temperature of about 65° C. Any excess of caustic alkali is removed by pressure while still hot, until the mass is about three times the weight of the dry cellulose it contains. The temperature is maintained at 50°–90° C. during pressing. The product is a solid cake containing caustic soda 40–50 per cent., cellulose 30–35 per cent., and water 20–25 per cent. The steeping of the cellulose is carried out so that the alkali cellulose is not exposed to the air; in this case the time of steeping may be longer than if air is in contact with the alkali cellulose. These alkali celluloses are suitable for the preparation of cellulose derivatives such as cellulose ethers.

237,716. Carbon Disulphide, Process for Producing. E. Legeler, Premnitz Westhavelland, Germany. Application date, July 11, 1924.

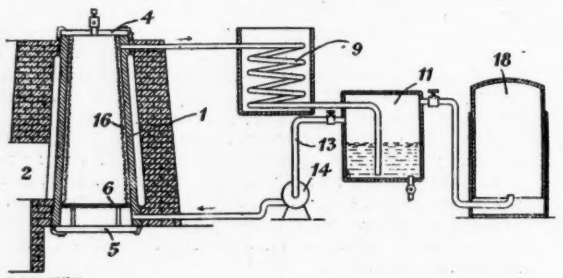
In the manufacture of carbon disulphide by the reaction of carbon and sulphur in a retort, the sulphur is separately evaporated and superheated, and the vapour is brought into contact with the carbon which has been heated to the reaction temperature either directly by an electric current, or by external heating, or by an air blast. When sufficient sulphur has combined with the carbon, separate heating of the reaction chamber may be dispensed with, since the formation of the disulphide is an exothermic process. The reaction temperature can be maintained if the size of the reaction chamber and the rate of formation of the carbon disulphide are suitably proportioned to one another, and the apparatus is heat insulated. If the heat insulation is insufficient, or the rate of production is lowered, it may be necessary to supply some additional heat, but a considerable economy of fuel is effected in any case.

237,739. Dyeing Acetyl Silk. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, W. H. Perkin, Organic Chemical Laboratory, South Parks Road, Oxford, and S. C. Bate, Crumpsall Vale Chemical Works, Blackley, Manchester. Application date, August 22, 1924.

Specification No. 181,750 (see The Chemical Age, Vol. VII, p. 130) describes the manufacture of a new class of soluble acid colouring matters containing sulphato groups and belonging to the various series of azo dyestuffs, including disazo dyestuffs, triaryl-methane dyestuffs, azine colouring matters, oxazine colouring matters, and thiazine dyes. Most of these dyestuffs have no affinity for acetyl silk, although some may be used with advantage for dyeing acetyl silk—*i.e.*, the monoazo dyes, particularly the nitrated monoazo dyes. Those which contain an amino group in addition to the sulphatoethyl amino group can be diazotised on the fibre and then developed by combining the diazo compound with various phenols, amines, and amidophenols. The dyestuffs which contain only one azo group have little or no affinity for cotton, so that a mixed fabric can be selectively dyed with these dyestuffs, or if a mixture of these dyestuffs with one having an affinity for cotton but not for acetyl silk be used, the silk and cotton in a mixed fabric are dyed the corresponding colours. A large number of examples are given, showing that a range of colours from yellow to violet can be obtained.

237,757. Extracting Oil from Oil Bearing Sands and Similar Materials, Process of. H. Fairbrother, London. From Jackson Research Corporation, 37, West 44th Street, New York. Application date, September 22, 1924.

This process is for extracting oil from bituminous sands in which the oil is intimately mixed with the sand but not



237,757

chemically combined with it. In this process, the material is heated in a retort to a temperature sufficient only to vaporise the oil, and the vapour and gas are then passed through a condenser from which the uncondensed vapour and gas are passed through and around the retort. The retort 1 is heated by furnace 2 and is provided with a hinged cover 4 and a hinged discharge door 5 carrying a false bottom 6. The charge is spaced away from the walls of the retort by a grating 16, leaving a space for the circulation of gases. The oil-

bearing material is charged into the retort while still containing its content of moisture, and this moisture is converted into steam by the heat of the retort. The steam carries off the oil vapour and any volatile inorganic material in the sand, and these pass to a condenser 9, a collecting tank 11 for liquid, and a storage reservoir 18 for the uncondensed gas. The upper part of the tank 11 is connected by a pipe 13 to a blower 14, so that the gas can be delivered back to the space below the false bottom 6 of the retort. These gases pass upwards through the material in the retort and also round the grating 16, so that overheating of the outer part of the charge is prevented. It is thus possible to regulate the temperature to within a few degrees, and if this is maintained between 400° C. and 425° C. the oil can be extracted without cracking it to form light hydrocarbons or permanent gas.

237,762. Nitrogen Peroxide, Manufacture of. Soc. d'Etudes Minières and Industrielles, 1 bis, Rue du Hâvre, Paris. International Convention date, September 18, 1924.

It is known that a yield of 97–100 per cent. of nitrogen peroxide can be obtained by the oxidation of ammonia, if an undried mixture of 4 volumes of ammonia and 7 volumes of pure oxygen is passed over a catalyst consisting of 2 grams of rhodium black in a tube 1 centimetre in diameter heated to 500°–650° C., the rate being 700 c.c. per minute. It has now been found that the oxygen can be wholly or partly replaced by air while still retaining rhodium black as a catalyst, provided the rate of flow of the gas is less in accordance with the smaller oxygen content of the mixture. Thus if the 7 volumes of oxygen are replaced with 35 volumes of air, the speed of the mixture should be about one-fifth of that employed with pure oxygen. A suitable catalyst consists of asbestos carrying about 0·1–1 per cent. of rhodium black. A theoretical yield of nitrogen peroxide can be obtained.

237,779. Cement and Iron, Process of Making. E. C. Eckel, 1503, Decatur Street, Northwest, Washington, D.C., U.S.A. Application date, November 17, 1924.

Alumina cement is usually made in small vertical furnaces 30–45 inches in diameter and 10–15 feet in height. The fuel is usually coke, and the consumption is ¼ to ½ of the weight of cement produced. The cost of production is usually 2·5 to 3 times that of Portland cement. The raw materials employed are bauxite, and burned lime or quicklime. This mixture is alternated with layers of coke in the furnace and the molten cement is tapped off and ground. It is found that the grinding is complicated by the presence of globules of metallic iron due to the reduction of the iron oxide in the charge, and it is usually necessary to separate this iron before grinding. In this invention, alumina cement and iron are produced, the charge consisting of iron ore low in silica, bauxite, and limestone. When this charge is melted, the iron and cement are tapped off separately. The furnace employed has a height of at least five times the diameter, and is equipped with regenerative stoves, with gas recovery, and with a top designed to reduce dusting. The charge contains 25–55 per cent. of lime, or lime and magnesia, 25–50 per cent. of alumina, not more than 10 per cent. of silica, and not less than 10 per cent. of iron oxide. The raw materials employed are cheaper than those previously used, and briquetting or mixing is not necessary. The cement and iron are tapped off intermittently, thus allowing the reduced iron to separate completely from the molten cement. The slag obtained contains 25–50 per cent. of lime, 25–50 per cent. of alumina, 3–10 per cent. of iron oxide, 10–20 per cent. of silica and iron oxide combined.

237,688. Oxidation of Derivatives of Aromatic Hydrocarbons, Process for. E. B. Maxted and B. E. Coke, Manor Road, Penn, Wolverhampton. Application date, June 2, 1924.

Specification No. 228,771 (see The Chemical Age, Vol. XII, p. 256) describes the catalytic oxidation of aromatic hydrocarbons by passing the vapour with air over heated vanadate of tin or bismuth. In this invention, derivatives of aromatic hydrocarbons of the kind containing one or more side chains containing carbon and hydrogen attached to an aromatic nucleus and one or more nitro groups or halogens attached to the nucleus, are oxidised in a similar manner. Substances treated include ortho, meta, or para-nitrotoluene, nitroxylene, nitromesitylene, nitrodurene, nitronaphthalene, nitroanthracene, nitroethyl-benzene, nitropropyl-benzene, and the corresponding halogen compounds. In an example, a catalyst is prepared by precipitating stannic chloride with ammonium vanadate. The precipitate is dried below 300° C., and then employed at a temperature of 280°–300° C. A mixture of paranitrotoluene vapour and air produced pure paranitrobenzoic acid. In a similar manner, ortho-chlorotoluene is oxidised to orthochlorobenzoic acid, nitronaphthalene to nitrophthalic acid, and nitroanthracene to nitroanthraquinone. An example of the oxidation of a substance containing a side chain which does not consist solely of carbon and hydrogen is given by the oxidation of *p*-nitro-cinnamic acid to *p*-nitrobenzoic acid.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention :—210,795 (T. Levy), relating to a process of direct reduction of iron ores, see Vol. X, p. 39 (Metallurgical Section) ; 221,209 (R. Jacobsson), relating to a method of producing pure alumina, see Vol. XI, p. 477 ; 225,206 (Compagnie de l'Azote et des Fertilisants Soc. Anon.), relating to preparation of a solution of cyanamide from commercial calcium cyanamide, see Vol. XII, p. 116 ; 227,837 (E. C. Eckel), relating to a process of making cement and iron, see Vol. XII, p. 314 ; 235,227 (Siemens and Halske Akt.-Ges.), relating to production of colloidal solutions, see Vol. XIII, p. 175.

International Specifications not yet Accepted

236,230. Hydrogenating Tar Oils. W. Demann, 8, Schulstrasse, Hordel, near Bochum, Germany. International Convention date, June 30, 1924.

Tar oils are hydrogenated at ordinary pressure, and at 180°–200° C., using coke oven gas deprived of water vapour. The coke oven gas is dried by cooling, by calcium chloride, or by sulphuric acid, and the water vapour formed in the reaction is carried away by the gas. A colloidal nickel catalyst may be used, and the product may be treated with superheated steam to deodorise and decolorise it. The tar oils should be desulphurised before treatment.

236,538. Organo-Mercury Compounds. Abbot Laboratories, 4739, Ravenswood Avenue, Chicago, U.S.A. Assignees of G. W. Raiziss, 1720, Lombard Street, Philadelphia, U.S.A. International Convention date, July 2, 1924.

A hot solution of 4-nitro-*o*-cresol in caustic alkali is treated with an acetic solution of mercuric acetate and the solution neutralised to obtain 3:5-diacetoxy-mercuri-4-nitro-*o*-cresol. The precipitate is freed from the mercury derivative of nitro-indazole by taking it up with caustic alkali or ammonium hydroxide, acidifying, and washing the precipitate with methyl alcohol and ether.

To obtain 4-nitro-*o*-cresol, *o*-toluidine is nitrated in sulphuric acid solution at a low temperature and the sulphate decomposed with sodium hydroxide. The resulting 4-nitro-*o*-toluidine is diazotised in hot sulphuric acid solution, and steam injected into the product. The black tarry oil of nitro-indazole is separated off, and the yellow solution cooled to crystallising point.

236,563. Synthetic Drugs. Chemische Fabrik Auf Actien vorm. E. Schering, 170, Mullerstrasse, Berlin. International Convention date, July 2, 1924.

To obtain a symmetrical urea of *p*-oxy-*m*-aminophenyl-arsinic acid, the acid is treated with phosgene in alkali solution at 25°–80° C., preferably in the presence of sodium acetate. The starting material may be aminoacidylated one or more times, and then treated with phosgene. Examples are given of the production of the symmetrical urea of *p*-oxy-*m*-aminophenyl-arsinic acid, *m*-(*m*-aminobenzoylamino)-*p*-oxyphenyl-arsinic acid, and *m* (-*m*-aminobenzoyl-*m*-amino-*p*-toluylamino)-*p*-oxyphenyl-arsinic acid.

236,577. Carbon Disulphide. Chemische Fabrik Griesheim-Elektron, 31, Gutleutstrasse, Frankfort-on-Main, Germany. International Convention date, July 3, 1924.

Carbonaceous material is degasified by passing it through an electric furnace having a movable upper electrode. This

furnace is arranged above the main furnace, which is of the shaft type and electrically heated. The glowing carbon is fed, out of contact with air, into the carbon disulphide furnace below, in such a manner that the carbon disulphide vapour does not pass into the upper furnace.

236,591. SYNTHETIC RESINS. British Thomson-Houston Co., Ltd., Crown House, Aldwych, London. (Assignees of J. G. E. Wright, Alplaus, New York.) International Convention date, July 5, 1924.

The resins obtained by condensation and polymerisation of polyhydric alcohols such as glycerine and polybasic acids or their anhydrides such as phthalic anhydride, are hardened more rapidly by mixing with a " dehydration catalyst " such as calcium, magnesium or zinc oxide, or finely divided zinc or iron obtained by reducing a finely divided oxide by hydrogen. An example of a cement is given, comprising the resin from glycerine and phthalic anhydride, marble dust, finely divided iron, and acetone, with or without alcohol.

LATEST NOTIFICATIONS.

238,842. Process of manufacture of artificial silk and of artificial threads or filaments. Soc. Pour la Fabrication de la Soie " Rhodiaseta." August 22, 1924.

238,857. Process for protecting animal fibres under treatment with alkaline liquids. Akt.-Ges. für Anilin-Fabrikation. August 21, 1924.

238,869. Crushing and separating apparatus. Rheinische Maschinenfabrik. August 22, 1924.

238,889. Process for the production of active carbon. Metallbank und Metallurgische Ges. Akt.-Ges. August 20, 1924.

238,899. Method of and apparatus for the distillation of carbonaceous material. M. Fränkl. August 23, 1924.

238,900. Production of hydrated products of olefines. Rochlingsche Eisen-und Stahlwerke Akt.-Ges. August 23, 1924.

238,904. Manufacture of condensation products of urea or its derivatives and aldehydes. F. Pollak. August 25, 1924.

238,909. Process of distilling and drying bituminous material. H. Hütz. August 25, 1924.

Specifications Accepted with Date of Application

215,790. Sulphuric acid, Process of concentrating. Metal Traders Technical, Ltd. May 11, 1923.

218,998. Dissolving minerals containing alkali and alumina, Process of. Rhenania Verein Chemischer Fabriken Akt.-Ges., and H. Brenek. July 10, 1923.

219,304. Acylated diamines, Manufacture of. Soc. of Chemical Industry in Basle. July 17, 1923.

224,497. Dehydration, distillation, and cracking of hydrocarbons. Soc. Anon. des Petroles, Houilles, et Derives. November 10, 1923.

225,545. Salt-cake furnace, Device for feeding. Farbwerke vorm. Meister, Lucius, and Brüning. November 26, 1923.

225,866. Vulcanising rubber, Process for. E. Smith. December 6, 1923.

226,801. Refractory linings for hearths of metallurgical and other furnaces, Process for the production and repair of. Vacuumschmelze Ges. and W. Rohn. December 24, 1923.

238,270. Reduction of iron ores. J. G. Aarts. April 14, 1924.

238,297. Gravity concentration of ores. F. H. Cothay and Ropp Tin, Ltd. May 14, 1924.

238,314. Synthetic menthol, Process of making. Howards and Sons, Ltd., and J. W. Blagden, May 21, 1924. Addition to 213,991.

238,319. Oxygenated organic compounds, Manufacture and production of. J. Y. Johnson. (*Badische Anilin und Soda Fabrik.*) May 24, 1924.

238,347. Extraction of metals from their compounds. A. S. Cachemaille. (*Westinghouse Lamp Co.*) July 7, 1924.

238,385. Finely-divided sulphur, Manufacture of. W. F. Sutherst and H. Philipp. September 5, 1924.

238,428-9. Crude borate of lime (boronatrocalcite). Decomposing of—and plant and apparatus for the manufacture of concentrated boric acids from. E. L. Fleming and Atlantic Chemical Co., Ltd. November 22, 1924.

238,480. Electric gas purification, Process for. Lodge-Cottrell, Ltd. March 23, 1925. Addition to 177,117.

238,485. Cellulose esters, Solutions of. E. C. R. Marks. (*Carbide and Carbon Chemicals Corporation.*) April 3, 1925.

238,489. Crude carbon disulphide, Process for the continuous purification of. E. Legeler. September 3, 1924.

Applications for Patents

Büttner Werke Akt.-Ges. and Kleinmann, F. Treatment of natural aluminium hydroxides. 21,315. August 25.

Consortium für Nassmétallurgie. Purification of plumbiferous chloride liquors. 21,204. August 24. (Germany, March 20.)

Davey, F. Method of manufacturing carbon black from gas. 21,638. August 29.

Dodd, H., Sprent, W. C., and United Alkali Co., Ltd. Manufacture of hydroxychloranthraquinone. 21,502. August 27.

Farbenfabriken vorm. F. Bayer and Co. Manufacture of secondary disazo dyestuffs. 21,684. August 29. (Germany, October 20, 1924.)

Fränkl, M. Distillation of carbonaceous material. 21,158. August 24. (Germany, August 23, 1924.)

Heyl, G. E. Cement manufacture. 21,569, 21,570. August 28.

Hide, W. D. Filtering apparatus. 21,648. August 29.

Jahl, A. Production of metallic chlorides and sulphur from sulphides. 21,685. August 29. (Germany, July 3.)

Jahl, A. Production of barium hydroxide from barium sulphide. 21,686. August 29. (Germany, April 18.)

Kendall, S.W. Manufacture of white lead pigment. 21,412. August 26. (United States, September 24, 1924.)

May and Baker, Ltd., and Newbery, G. Manufacture of acyl derivatives of amino aryl compounds. 21,687. August 29.

May and Baker, Ltd. Manufacture of solutions for therapeutic use. 21,688. August 29.

Orkla Grube-Aktiebolag. Treatment of gases containing sulphuretted hydrogen and sulphur dioxide. 21,448. August 27. (Norway, September 10, 1924.)

Pollak, F. Manufacture of condensation products of urea, etc. 21,195. August 24. (Austria, August 25, 1924.)

Röchlingsche Eisen-und Stahlwerke Akt.-Ges. Production of hydrated products of olefines. 21,159. August 24. (Germany, August 23, 1924.)

Sinclair Refining Co. Method of cracking hydrocarbon oils. 21,385. August 26. (United States, October 24, 1924.)

Strohmenger, A. P. Production of emulsions of tar, etc. 21,667. August 29.

Woodall-Duckham (1920), Ltd. Apparatus for separating solids from liquids. 21,611, 21,612. August 28.

Chemical Works Closing Down

ALEXANDER CROSS AND SONS, LTD., chemical manufacturers, Glasgow, have decided, owing to the depression in the chemical trade, to close down their works at Camelon, Falkirk, from October 1 and for an indefinite period. Notices to this effect and in the following terms have been posted at the firm's works in Camelon : " The directors regret that, owing to the great depression in the chemical industry and to the fact that we cannot to-day manufacture in competition with Belgium and France, they have had to decide to close these works for an indefinite period on October 1, 1925. In view of the widespread unemployment, the directors have come to this decision with great reluctance, and they regret having to part with the services of employees who have been with them, in many cases, for a long period of years, but, unfortunately, circumstances leave them no option."

Cross and Sons acquired the works at Falkirk twenty years ago, and since then the premises have been extended and modernised from time to time. Normally, they give employment to about 150 men, but in busy periods up to 300 men have been engaged. The chief production is chemical fertilisers for agricultural purposes, but, with the cheaper labour and longer working hours in Belgium and France and the depreciated exchange in these countries, the firm find it impossible at the present time to continue the manufacture at Camelon except at a very considerable loss.

Dermatitis among Bakers

RECENT statements at the conference of operative bakers have called attention to the increase in baker's dermatitis, and operatives have asked the Ministry of Health to apply expert research into the causes and cure of the disease.

The use of chemicals for bleaching the flour is thought to be a cause, and operatives who handle the flour and dough are most susceptible to the skin disease. It is the opinion of many that the use of chemicals could be discontinued with advantage both to baker and to consumer. The chemicals remove the pigment technically known as the fat of flour and prevent a yellow tinge. The public demand for " white " bread at the expense even of purity is said to be the real cause of such practice.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, September 4, 1925.

THERE is no feature of outstanding interest to report. On the whole the uptake of chemicals shows a tendency to improve, and is considerably better than was the case a few weeks ago. There are very few price changes indicated.

Export trade has been rather slack.

General Chemicals

ACETONE is a firm market and supplies are scarce in early positions. Price £75 to £76 per ton ex wharf, London.

ACID ACETIC has been in better demand. It is quoted £37 to £38 per ton for technical and £38 to £39 per ton for pure 80% grades.

ACID CITRIC is very quiet indeed. There seems little prospect of the market recovering this season. Price nominally 1s. 3½d. to 1s. 4d. per lb.

ACID FORMIC has only been in very small demand. Price nominally £48 per ton for 85% technical.

ACID LACTIC is very quiet. It is quoted £43 10s. to £44 per ton for 50% by weight.

ACID OXALIC has been in rather better inquiry, although transactions are on the small side. Price is 3¾d. per lb.

ACID TARTARIC is very quiet, makers' prices being about 11½d. per lb.

ALUMINA SULPHATE.—There is still great competition for the few orders which there are about. Price being about £6 5s. per ton.

ARSENIC is in very poor demand. Price nominally £21 per ton, but within limits buyers can make their own terms.

BARIUM CHLORIDE is in very fair demand at £9 per ton.

CREAM OF TARTAR remains active at about £74 to £77 per ton, according to position and grade.

EPSOM SALTS are very firm, price about £5 per ton, ex wharf.

FORMALDEHYDE is decidedly firmer, being quoted at £42 per ton, ex wharf.

LEAD ACETATE is in very fair demand at £45 per ton for White and £40 per ton for Brown.

LIME ACETATE is quiet and firm at £15 10s. per ton for Grey 80%.

POTASSIUM CAUSTIC is unchanged.

POTASSIUM CHLORATE remains very firm, spot supplies realising about 4¼d. per lb.

POTASSIUM PERMANGANATE is a steady trade of hand to mouth proportions at about 7¾d. per lb.

POTASSIUM PRUSSIATE.—There is not much doing, but price is firm at about 7½d. per lb.

SODIUM ACETATE is only moderately inquired for and the makers' price is firm and the value to-day is about £18 10s. per ton, ex wharf.

SODIUM BICHROMATE remains unchanged at British makers' prices.

SODIUM HYPOSULPHITE.—The photographic quality is in active demand. The commercial quality is featureless.

SODIUM PRUSSIATE is quoted at 4⅜d. to 4½d. per lb.

SODIUM NITRITE.—A fair business has been passing at £22 10s. to £23 per ton.

SODIUM SULPHIDE is unchanged.

ZINC SULPHATE is unchanged.

Coal Tar Products

There is very little change to report in the market for Coal Tar products from last week.

90% BENZOL is slightly weaker, and is quoted at 1s. 8½d. to 1s. 9d. per gallon on rails.

PURE BENZOL is steady at 1s. 11d. to 2s. per gallon, on rails.

CREOSOTE OIL is firm at 5¾d. per gallon on rails in the North, and 7d. to 7¼d. per gallon in the South.

CRESYLIC ACID remains quiet, and is quoted at 1s. 5d. to 1s. 6d. per gallon on rails for the Pale quality 97/99%, while the Dark quality 95/97% can be obtained at 1s. 2d. per gallon, on rails.

SOLVENT NAPHTHA is steady at 1s. 4d. to 1s. 5d. per gallon, on rails.

HEAVY NAPHTHA can be bought at 1s. 2d. per gallon, on rails.

NAPTHALENES are weak, the lower grades being worth from £3 to £3 15s. per ton, while the 74/76° quality is quoted at £5 to £5 10s. per ton, and the 76/78° quality at £5 15s. to £6 per ton.

PITCH.—The demand remains quiet and prices are somewhat easier. To-day's approximate values are 40s. to 42s. 6d. f.o.b. London; 37s. 6d. to 40s. f.o.b. East and West Coast ports.

Latest Oil Prices

LONDON.—LINSEED OIL steady. Spot, £40 10s.; September, £39 10s.; September-December, £39 12s. 6d.; January-April, £39 10s. RAPE OIL quiet. Crude-crushed, spot, £49 10s.; technical refined, £52 10s. COTTON OIL quiet. Refined, common edible, £49; Egyptian, crude, £43 10s.; deodorised, £51. TURPENTINE firm and 9d. to 1s. per cwt. higher. American, spot, 73s.; October-December, 74s.; and January-April, 76s. 3d., after 76s. had been paid.

HULL.—LINSEED OIL.—Naked, spot to September-December, £39 15s.; January-April, £39 12s. 6d. COTTON OIL.—Naked, Bombay, crude, £39 15s.; Egyptian, crude, £42 10s.; edible, refined, £46 10s.; deodorised, £49; technical, £43. PALM KERNEL OIL.—Crushed, naked, 5½ per cent., £42 10s. GROUNDNUT OIL.—Crushed/extracted, £48; deodorised, £52. SOYA OIL.—Extracted and crushed, £42 10s.; deodorised, £46. RAPE OIL.—Extracted, £48 10s. per ton, net cash terms, ex-mill. CASTOR OIL and COD OIL unchanged.

Nitrogen Products Market

Export.—The demand for sulphate of ammonia during the summer months has been stimulated by the low prices at which producers were offering. The consequence is that the prices for September/October are 5s. per ton higher. British producers are now quoting on the basis of £11 15s. per ton f.o.b. in single bags. Considerable business is being done at this figure.

Home.—Announcement of home prices which have previously been published has had little effect on the demand, which is always small at this period of the year. Only isolated orders are coming in now for prompt delivery. There are several bookings for forward delivery and a heavy home season is anticipated.

Nitrate of Soda.—The nitrate of soda market is quiet; sales for prompt arrival have been made at £11 and £11 5s. c.i.f. chief European ports. The usual resales business is being transacted for forward position at prices varying according to delivery points.

American Market Movements

(From *Drug and Chemical Market*)

Heavy chemical prices maintained owing to an increased demand. Zinc carbonate higher. Arsenic weakens further. Copper sulphate remains firm. Formic acid weak.

Benzene situation slightly easier owing to break in gasoline market. Toluene slightly tighter. Other light oils steady. Cresylic acid lower. Pyridine firm. Intermediates in mixed condition although the demand has improved. The market for fine chemicals shows a firmer tone although little in the way of new business has yet appeared. One or two items are lower. Thymol is higher, quicksilver and guaiacol liquid lower.

Vegetable oils steady. Linseed oil higher. Chinawood oil quiet. Rapeseed oil firm. Animal oils and fats continue to sell at high prices. Fish oils remain active at recent reductions.

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

Acid Acetic, 40% Tech.—£20 per ton.

Acid Boric, Commercial.—Crystal, £40 per ton, Powder, £42 per ton.

Acid Hydrochloric.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

Acid Nitric, 80° Tw.—£21 10s. to £27 per ton, makers' works, according to district and quality.

Acid Sulphuric.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations: 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

Ammonia Alkali.—£6 15s. per ton f.o.r. Special terms for contracts.

Bleaching Powder.—Spot, £10 10s. d/d; Contract, £9 10s. d/d, 4 ton lots.

Bisulphite of Lime.—£7 10s. per ton, packages extra, returnable.

Borax, Commercial.—Crystal, £25 per ton. Powder, £26 per ton. (Packed in 2-cwt. bags, carriage paid any station in Great Britain.)

Calcium Chlorate (Solid).—£5 12s. 6d. to £5 17s. 6d. per ton d/d, carriage paid.

Copper Sulphate.—£25 to £25 10s. per ton.

Methylated Spirit 64 O.P.—Industrial, 2s. 5d. to 2s. 11d. per gall. Mineralised, 3s. 8d. to 4s. per gall., in each case according to quantity.

Nickel Sulphate.—£38 per ton d/d.

Nickel Ammonia Sulphate.—£38 per ton d/d.

Potash Caustic.—£30 to £33 per ton.

Potassium Bichromate.—5d. per lb.

Potassium Chlorate.—3¾d. per lb., ex wharf, London, in cwt. kegs.

Salammoniac.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton. Carr. pd.

Salt Cake.—£3 15s. to £4 per ton d/d. In bulk.

Soda Caustic, Solid.—Spot lots delivered, £15 12s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

Soda Crystals.—£5 to £5 5s. per ton ex railway depots or ports.

Sodium Acetate 97/98%.—£21 per ton.

Sodium Bicarbonate.—£10 10s. per ton, carr. paid.

Sodium Bichromate.—4d. per lb.

Sodium Bisulphite Powder 60/62%.—£17 per ton for home market, 1-cwt. iron drums included.

Sodium Chlorate.—3d. per lb.

Sodium Nitrate refined 96%.—£13 5s. to £13 10s. per ton, ex Liverpool.

Sodium Nitrite 100% basis.—£27 per ton d/d.

Sodium Phosphate, £14 per ton, f.o.r. London, casks free.

Sodium Sulphate (Glauber Salts).—£3 12s. 6d. per ton.

Sodium Sulphide conc. solid. 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. pd.

Sodium Sulphide Crystals.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. pd.

Sodium Sulphite, Pea Crystals.—£14 per ton f.o.r. London, 1-cwt. kegs included.

Coal Tar Products

Acid Carbolic Crystals.—4¾d. to 5d. per lb. Slightly better demand. Crude 60's, 1s. 2d. to 1s. 3d. Slightly firmer.

Acid Cresylic 97/99.—1s. 6d. to 1s. 9d. per gall. Better demand. Pale, 95%, 1s. 5d. to 1s. 6d. per gall. Dark, 1s. 5d. per gall.

Anthracene Paste 40%.—3d. per unit per cwt.—Nominal price. No business.

Anthracene Oil, Strained.—7¾d. per gall. Unstrained, 7d. per gall. Nominal.

Benzol.—Crude 65's.—11d. to 1s. 3d. per gall., ex works in tank wagons. Standard Motor, 1s. 8d. to 1s. 10d. per gall., ex works in tank wagons. Pure, 2s. 1d. to 2s. 2d. per gall., ex works in tank wagons. Firm.

Toluol.—90%, 1s. 8¼d. to 1s. 9d. per gall. More inquiry. Pure, 1s. 9¼d. to 2s. 2d. per gall.

Xylol Commercial.—1s. 9¼d. to 2s. 3d. per gall. Pure, 3s. 3d. per gall.

Creosote.—Cresylic, 20/24%, 8¼d. per gall. Standard specification, middle oil, heavy, 5¾d. to 6¼d. per gall. Steady demand for near delivery.

Naphtha.—Solvent 90/160, 1s. 6d. to 1s. 10d. per gall. Demand good. Solvent 90/190, 1s. to 1s. 0¼d. per gall. Fair demand.

Naphthalene Crude.—Drained Creosote Salts, £5 per ton. Market quiet. Whizzed or hot pressed. No demand.

Naphthalene.—Crystals and Flaked, £10 to £13 per ton, according to districts. Very quiet.

Pitch.—Medium soft, 37s. 6d. to 42s. 6d. per ton, according to district. Market flat.

Pyridine.—90/160, 19s. 6d. to 20s. per gall. Heavy, 11s. 3d. to 11s. 6d. per gall. Fair business.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated.

Acetic Anhydride 95%.—1s. 7d. per lb.

Acid Anthranilic 7s. per lb. 100%.

Acid Benzoic 1s. 9d. per lb.

Acid H.—3s. 6d. per lb. 100% basis d/d.

Acid Naphthionic.—2s. 2d. per lb. 100% basis d/d.

Acid Neville and Winther.—4s. 10d. per lb. 100% basis d/d.

Acid Sulphanilic.—9d. per lb. 100% basis d/d.

Aluminium Chloride, anhydrous.—10d. per lb. d/d.

Aniline Oil.—7d. to 7½d. per lb. naked at works.

Aniline Salts.—7d. to 8d. per lb. naked at works.

Antimony Pentachloride.—1s. per lb. d/d.

Benzidine Base.—3s. 6d. per lb. 100% basis d/d.

Benzyl Chloride 95%.—1s. 1d. per lb.

p-Chlorphenol.—4s. 3d. per lb. d/d.

p-Chloraniline.—3s. per lb. 100% basis.

o-Cresol 29/31° C.—3d. per lb. Demand quiet.

m-Cresol 98/100%.—2s. 1d. per lb. Demand moderate.

p-Cresol 32/34° C.—2s. 1d. per lb. Demand moderate.

Dichloraniline.—2s. 3d. per lb.

Dichloraniline S. Acid.—2s. 3d. per lb. 100% basis.

Diethylaniline.—4s. 3d. per lb. d/d., packages extra, returnable.

Dimethylaniline.—2s. 1d. per lb. d/d. Drums extra.

Dinitrobenzene.—9d. per lb. naked at works.

Dinitrochlorbenzene.—£84 10s. per ton d/d.

Dinitrotoluene.—48/50° C. 8d. to 9d. per lb. naked at works. 66/68° C. 1s. per lb. naked at works.

Diphenylaniline.—2s. 10d. per lb. d/d.

G. Salt.—2s. 2d. per lb. 100% basis d/d.

a-Naphthol.—1s. 10d. per lb. d/d. Fair home inquiry.

B-Naphthol.—1s. per lb. d/d. Fair home inquiry.

a-Naphthylamine.—1s. 3d. per lb. d/d. Fair home inquiry.

B-Naphthylamine.—3s. 9d. per lb. d/d.

m-Nitraniline.—3s. 9d. per lb. d/d.

p-Nitraniline.—1s. 11d. per lb. d/d.

Nitrobenzene.—5¼d. to 5½d. per lb. naked at works. Good home inquiry.

o-Nitrochlorbenzol.—2s. 3d. per lb. 100% basis d/d.

Nitronaphthalene.—10d. per lb. d/d.

p-Nitrophenol.—1s. 9d. per lb. 100% basis d/d.

p-Nitro-*o*-amido-phenol.—4s. 6d. per lb. 100% basis.

m-Phenylene Diamine.—4s. per lb. d/d.

p-Phenylene Diamine.—9s. 9d. per lb. 100% basis d/d.

R. Salt.—2s. 4d. per lb. 100% basis d/d.

Sodium Naphthionate.—2s. 2d. per lb. 100% basis d/d.

o-Toluidine.—10d. per lb.

p-Toluidine.—2s. 3d. per lb. naked at works.

m-Toluylene Diamine.—4s. per lb. d/d.

Wood Distillation Products

Acetate of Lime.—Brown £9 10s. to £10. Quiet market. Grey, £15 per ton. Liquor, 9d. per gall. 32° Tw.

Acetone.—£73 per ton.

Charcoal.—£7 5s. to £8 10s. per ton, according to grade and locality.

Iron Liquor.—1s. 7d. per gall. 32° Tw. 1s. 2d. per gall, 24° Tw.

Red Liquor.—10d. to 1s. per gall. 14/15° Tw.

Wood Creosote.—2s. 9d. per gall. Unrefined.

Wood Naphtha, Miscible.—4s. 3d. per gall. 60% O.P. Solvent, 4s. 6d. per gall. 40% O.P.

Wood Tar.—£4 per ton.

Brown Sugar of Lead.—£43 per ton.

Rubber Chemicals

Antimony Sulphide.—Golden, 7¼d. to 1s. 5d. per lb., according to quality, Crimson, 1s. 5d. to 1s. 7½d. per lb., according to quality.

Arsenic Sulphide, Yellow.—2s. per lb.

Barytes.—£3 10s. to £6 15s. per ton, according to quality.

Cadmium Sulphide.—4s. 4d. per lb.

Carbon Bisulphide.—£25 to £28 per ton, according to quantity.

Carbon Black.—5½d. per lb., ex wharf.

Carbon Tetrachloride.—£55 to £60 per ton, according to quantity, drums extra.

Chromium Oxide, Green.—1s. 3d. per lb.

Diphenylguanidine, 4s. to 4s. 3d. per lb.

Indiarubber Substitutes, White and Dark.—5¾d. to 6¾d. per lb.

Lamp Black.—£43 per ton, barrels free.

Lead Hyposulphite.—9d. per lb.

Lithopone, 30%.—£22 10s. per ton.

Mineral Rubber "Rubpron."—£13 12s. 6d. per ton f.o.r. London.

Sulphur.—£9 to £11 per ton, according to quality.

Sulphur Chloride.—4d. per lb., carboys extra.
Sulphur Precip. B.P.—£50 to £55 per ton.
Thiocarbamide.—2s. 6d. to 2s. 9d. per lb.
Thiocarbanilide.—2s. 1d. to 2s. 3d. per lb.
Vermilion, Pale or Deep.—5s. per lb.
Zinc Sulphide.—1s. 1d. per lb.

Pharmaceutical and Photographic Chemicals

Acid, Acetic, 80 % B.P.—£39 per ton ex wharf London in glass containers.
Acid, Acetyl Salicylic.—2s. 6½d. to 2s. 8d. per lb. Keen competition continuing. Good demand.
Acid, Benzoic B.P.—2s. to 2s. 3d. per lb., according to quantity.
Acid, Boric B.P.—Crystal £46 per ton, Powder £50 per ton. Carriage paid any station in Great Britain.
Acid, Camphoric.—19s. to 21s. per lb.
Acid, Citric.—1s. 2½d. to 1s. 3d. per lb., less 5%. Weak.
Acid, Gallic.—2s. 9d. per lb. for pure crystal, in cwt. lots.
Acid, Pyrogallic, Crystals.—5s. 4d. to 5s. 6d. per lb.
Acid, Salicylic.—1s. 4d. to 1s. 6d. per lb. Low price due to competition. Technical.—10½d. to 11d. per lb.
Acid, Tannic B.P.—2s. 8d. per lb.
Acid, Tartaric.—11d. to 11½d. per lb.
Amidol.—9s. per lb., d/d.
Acetanilide.—1s. 5d. per lb. for quantities.
Amidopyrin.—13s. 3d. per lb.
Ammonium Benzoate.—3s. 3d. to 3s. 6d. per lb., according to quantity.
Ammonium Carbonate B.P.—£37 per ton. Powder, £39 per ton in 5 cwt. casks.
Atropine Sulphate.—11s. 6d. per oz. for English make.
Barbitone.—10s. 3d. to 10s. 6d. per lb. Lower owing to increased supplies.
Benzonaphthol.—3s. 6d. per lb. spot.
Bismuth Carbonate.—12s. 9d. to 14s. 9d. per lb.
Bismuth Citrate.—11s. 4d. to 13s. 4d. per lb.
Bismuth Salicylate.—10s. 2d. to 12s. 2d. per lb.
Bismuth Subnitrate.—10s. 9d. to 12s. 9d. per lb.
according to quantity.
} Prices advanced. Supplies of the metal much easier.
Borax B.P.—Crystal £29, Powder £30 per ton. Carriage paid any station in Great Britain.
Bromides.—Potassium, 1s. 11d. to 2s. per lb.; sodium, 2s. 1d. to 2s. 2d. per lb.; ammonium, 2s. 5d. to 2s. 6d. per lb., all spot. British or Imported. Firm.
Calcium Lactate.—1s. 4d. to 1s. 6d., according to quantity.
Chloral Hydrate.—3s. 5d. to 3s. 6d. per lb., duty paid.
Chloroform.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
Creosote Carbonate.—6s. 9d. per lb.
Formaldehyde.—£40 per ton, in barrels ex wharf.
Glycerophosphates.—Fair business passing. Calcium, soluble and citrate free, 7s. per lb.; iron, 8s. 9d. per lb.; magnesium, 9s. per lb.; potassium, 50%, 3s. 6d. per lb.; sodium, 60%, 2s. 6d. per lb.
Guaiacol Carbonate.—6s. 2d. to 6s. 6d. per lb.
Hexamine.—2s. 2d. powder crystal, 2s. 6d. free running crystal, per lb.
Homatropine Hydrobromide.—30s. per oz.
Hydrastine Hydrochloride.—English make offered at 120s. per oz.
Hydrogen Peroxide (12 vols.).—1s. 8d. per gallon f.o.r. makers' works, naked.
Hydroquinone.—4s. 4¾d. per lb., in cwt. lots.
Hypophosphites.—Calcium, 3s. 6d. per lb., for 28 lb. lots; potassium, 4s. 1d. per lb.; sodium, 4s. per lb.
Iron Ammonium Citrate B.P.—1s. 8d. to 1s. 11d. per lb. Green, 2s. 2d. to 2s. 7d. per lb. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Magnesium Carbonate.—Light Commercial, £34 per ton net. Light pure, £46 per ton.
Magnesium Oxide.—Light Commercial, £65 per ton, less 2½%, price reduced; Heavy Commercial, reduced to £24 per ton, less 2½%; Heavy Pure, 2s. to 2s. 3d. per lb., according to quantity.
Menthol.—A.B.R. recrystallised B.P., 42s. 6d. net per lb., October delivery. Synthetic, 22s. 6d. to 27s. 6d. per lb., according to quality. English make.
Mercurials.—Red oxide, 5s. 2d. to 5s. 4d. per lb.; Corrosive sublimate, 3s. 7d. to 3s. 9d. per lb; white precipitate, 4s. 6d. to 4s. 8d. per lb.; Calomel, 3s. 10d. to 4s. per lb. Still quiet.
Methyl Salicylate.—1s. 4½d. to 1s. 8d. per lb. British cheaper than imported.
Methyl Sulphonal.—16s. 9d. to 17s. per lb. Demand limited.
Metol.—11s. per lb. British make.
Paraformaldehyde.—2s. for B.P. quality.
Paraldehyde.—1s. 4d. per lb., in free bottles and cases.
Phenacetin.—4s. to 4s. 3d. per lb.
Phenazone.—6s. to 6s. 3d. per lb. Spot lower than forward price.
Phenolphthalein.—4s. to 4s. 3d. per lb. Supply exceeds demand.
Potassium Bitartrate 99/100% (Cream of Tartar).—78s. per cwt., less 2½% for ton lots.
Potassium Citrate.—1s. 7d. to 1s. 10d. per lb.
Potassium Ferricyanide.—1s. 9d. per lb. Quiet.
Potassium Iodide.—16s. 8d. to 17s. 5d. per lb., according to quantity. Steady market.
Potassium Metabisulphite.—6d. to 9d. per lb., 1-cwt. kegs included, f.o.r. London.
Potassium Permanganate.—B.P. crystals, 7¾d. per lb., spot. Firmer.
Quinine Sulphate.—2s. 3d. to 2s. 4d. per oz., in 100 oz. tins. Steady market.
Resorcin.—3s. 10½d. per lb. In fair quantities.
Saccharin.—63s. per lb. in 50 lb. lots.
Salol.—3s. 3d. to 3s. 6d. per lb.
Silver Proteinate.—12s. per lb. for satisfactory product light in colour.
Sodium Benzoate, B.P.—1s. 10d. to 2s. 2d. per lb.
Sodium Citrate, B.P.C., 1911.—1s. 4d. to 1s. 7d. per lb., B.P.C., 1923. 1s. 7d. to 1s. 8d. per lb., according to quantity. U.S.P., 1s. 7d. to 1s. 10d. per lb.
Sodium Hyposulphite, Photographic.—£14 to £15 per ton, according to quantity, d/d consignee's station in 1-cwt. kegs.
Sodium Metabisulphite Crystals.—37s. 6d. to 60s. per cwt., net cash, according to quantity.
Sodium Nitroprusside.—16s. per lb.
Sodium Potassium Tartrate (Rochelle Salt).—80s. per cwt., for ton lots and upwards.
Sodium Salicylate.—Powder, 1s. 10d. to 1s. 11d. per lb. Crystal 1s. 11d. to 2s. per lb. Flake, 2s. 1d. to 2s. 4d. per lb. Prices cut fine: keen competition.
Sodium Sulphide, pure recrystallised.—10d. to 1s. 2d. per lb.
Sodium Sulphite, anhydrous, £27 10s. to £28 10s. per ton, according to quantity; 1-cwt. kegs included.
Sulphonal.—12s. 3d. to 12s. 6d. per lb. Limited demand.
Thymol.—11s. to 15s. per lb.

Perfumery Chemicals

Acetophenone.—9s. per lb.
Aubepine (ex Anethol).—10s. per lb.
Amyl Acetate.—3s. per lb.
Amyl Butyrate.—6s. 6d. per lb.
Amyl Salicylate.—3s. 1½d. per lb.
Anethol (M.P. 21/22° C.).—5s. per lb.
Benzyl Acetate from Chlorine-free Benzyl Alcohol.—2s. 4d. per lb.
Benzyl Alcohol free from Chlorine.—2s. 4d. per lb.
Benzaldehyde free from Chlorine.—2s. 9d. per lb.
Benzyl Benzoate.—2s. 9d. per lb.
Cinnamic Aldehyde Natural.—15s. 6d. per lb.
Coumarin.—13s. per lb.
Citronellol.—19s. per lb.
Citral.—9s. per lb.
Ethyl Cinnamate.—9s. per lb.
Ethyl Phthalate.—3s. per lb.
Eugenol.—9s. 6d. per lb.
Geraniol (Palmarosa).—27s. per lb.
Geraniol.—8s. to 16s. per lb.
Heliotropine.—6s. 3d. per lb.
Iso Eugenol.—14s. 6d. per lb.
Linalol ex Bois de Rose.—19s. 6d. per lb.
Linalyl Acetate.—18s. 6d. per lb.
Methyl Anthranilate.—9s. 3d. per lb.
Methyl Benzoate.—5s. per lb.
Musk Ambrette.—50s. per lb.
Musk Ketone.—33s. 6d. per lb.
Musk Xylol.—8s. 3d. per lb.
Nerolin.—4s. per lb.
Phenyl Ethyl Acetate.—14s. per lb.
Phenyl Ethyl Alcohol.—12s. per lb.
Rhodinol.—36s. 6d. per lb.
Safrol.—1s. 8d. per lb.
Terpineol.—1s. 9½d. per lb.
Vanillin.—22s. 9d. per lb.

Essential Oils

Almond Oil.—12s. 6d. per lb.
Anise Oil.—3s. per lb.
Bergamot Oil.—22s. per lb.
Bourbon Geranium Oil.—16s. 6d. per lb.
Camphor Oil.—60s. per cwt.
Cananga Oil, Java.—11s. 3d. per lb.
Cinnamon Oil, Leaf.—5d. per oz.
Cassia Oil, 80/85%.—9s. per lb.
Citronella Oil.—Java, 85/90%, 3s. 7d.; Ceylon, 2s. 3d. per lb.
Clove Oil.—7s. 6d. per lb.
Eucalyptus Oil, 70/75%.—1s. 10d. per lb.
Lavender Oil.—French 38/40% Esters, 26s. per lb.
Lemon Oil.—6s. per lb.
Lemongrass Oil.—4s. 6d. per lb.
Orange Oil, Sweet.—10s. 9d. per lb.
Otto of Rose Oil.—Bulgarian, 60s. per oz. Anatolian, 35s. per oz.
Palma Rosa Oil.—13s. 9d. per lb.
Palma Rose Oil.—15s. 3d. per lb.
Peppermint Oil.—Wayne County. No good quality material available. Japanese, 20s. 6d. per lb. Much firmer.
Petitgrain Oil.—9d. per lb.
Sandal Wood Oil.—Mysore, 26s. per lb. Australian, 18s. 6d. per lb.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, September 4, 1925.

THE heavy chemical market has been moderately active during the past week, good inquiry being received both for home consumption and export. There are no noteworthy changes in prices, but the tendency is upward.

Industrial Chemicals

ACID ACETIC.—In moderate request and price unchanged; 98/100% glacial, £56 to £67 per ton, according to quality and packing, c.i.f. U.K. ports; 80% pure, £40 to £42 per ton; 80% technical, £39 to £41 per ton, packed in casks c.i.f. U.K. ports.

ACID BORIC.—Crystal, granulated or small flaked, £40 per ton. Powdered, £42 per ton, packed in bags carriage paid U.K. stations.

ACID CARBOLIC, ICE CRYSTALS.—Still in good demand. Quoted 5d. per lb. delivered or f.o.b. U.K. ports; but this figure could probably be shaded for fairly large quantities.

ACID CITRIC, B.P. CRYSTALS.—Rather cheaper. Spot material now available at about 1s. 4d. per lb., less 5% ex store. Offered for early delivery at a fraction less.

ACID FORMIC, 85%.—Spot material unchaged at £48 10s. per ton, ex store. On offer from the Continent at about £47 10s. per ton c.i.f. U.K. ports.

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy ex works.

ACID NITRIC, 80°.—Manufacturers advise reduction of about 10s. per ton. Now quoted £23 5s. per ton, ex station, in full truck loads.

ACID OXALIC, 98/100%.—Spot material quoted 3½d. to 3¾d. per lb., ex store, according to quantity. Offered for forward delivery at about 3¾d. per lb., ex wharf.

ACID SULPHURIC.—144°, £3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Spot material rather cheaper at about 11½d. per lb., less 5% ex store. Offered for forward delivery at 11½d. per lb., less 5% ex wharf.

ALUMINA SULPHATE, 17/18%, IRON FREE.—Quoted £6 15s. per ton, ex store, spot delivery. Offered for prompt shipment from the Continent at £6 5s. per ton, c.i.f. U.K. ports.

ALUM, LUMP POTASH.—Quoted £9 5s. per ton, ex store, spot delivery. On offer for early shipment from the Continent at about £8 per ton, c.i.f. U.K. ports.

AMMONIA ANHYDROUS.—Moderate demand and price unchanged at 1s. 4½d. per lb., less 5% ex station. Containers extra and returnable.

AMMONIA CARBONATE.—Lump, £37 per ton; powdered, £39 per ton; packed in 5 cwt. casks, delivered U.K. ports.

AMMONIA LIQUID, 880°.—In steady demand. Unchanged at 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals quoted £28 per ton, ex station. Offered from the Continent at about £24 per ton, c.i.f. U.K. ports. Fine white crystals quoted £19 10s. per ton, c.i.f. U.K. ports.

ARSENIC.—Refined white Cornish quoted £25 per ton, ex store. Offered for forward delivery at about £24 per ton, ex wharf. Foreign arsenic on offer at about £20 10s. per ton, c.i.f. U.K. ports.

BARIUM CHLORIDE.—Large crystals quoted £9 10s., per ton, ex store. On offer at £8 5s., per ton, c.i.f. U.K. ports to come forward. Fine white crystals quoted about £7 5s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—Spot lots English material, £10 10s. per ton, ex station. Contracts 20s. per ton less. On offer from the Continent at about £8 7s. 6d. per ton, c.i.f. U.K. ports.

BARYTES.—English material, unchanged at £5 5s. per ton, ex works. Continental quoted £5 per ton, c.i.f. U.K. ports.

BORAX.—Granulated, £24 10s. per ton; crystals, £25 per ton; powdered, £26 per ton. Carriage paid U.K. stations; minimum ton lots.

CALCIUM CHLORIDE.—English manufacturers' prices unchanged at £5 12s. 6d. to £5 17s. 6d. per ton, carriage paid U.K. stations. Continental on offer at £4 2s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Now quoted £3 10s. per ton, ex wharf, packed in casks.

COPPER SULPHATE.—Continental material quoted £22 per ton, c.i.f. U.K. ports. English for export about £24 10s. per ton f.o.b.

FORMALDEHYDE, 40%.—Spot material quoted £39 10s. per ton, ex store. Offered for forward delivery at about £39 per ton, c.i.f. U.K. ports.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental quoted £2 17s. 6d. per ton, c.i.f. U.K. ports.

LEAD, RED.—Quoted £43 per ton c.i.f. U.K. ports. Early delivery Spot material available at about £44 per ton, ex store.

LEAD WHITE.—Now quoted £44 10s. per ton, ex store. Spot delivery.

LEAD, ACETATE.—White crystals, spot material, now quoted £45 per ton, ex store. Brown about £43 per ton, ex store. White crystals on offer from the Continent at £43 15s. per ton c.i.f. U.K. ports. Brown about £38 10s. per ton c.i.f. U.K. ports.

MAGNESITE, GROUND CALCINED.—Now quoted £8 15s. per ton, ex station.

POTASH CAUSTIC, 88/92%.—Quoted £27 10s. per ton c.i.f. U.K. ports. Limited quantities of spot material available at about £30 per ton, ex store.

POTASSIUM BICHROMATE.—Price for home consumption, 5d. per lb., delivered.

POTASSIUM CARBONATE.—Rather scarce for immediate delivery. Spot material now quoted £27 per ton, ex store. Limited quantities available for early shipment at about £26 per ton c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99/100%.—Quoted £32 per ton c.i.f. U.K. ports. Offered for October delivery at slightly less.

POTASSIUM NITRATE, SALTPETRE, 99%.—Refined granulated quoted at about £24 10s. per ton c.i.f. U.K. ports. Spot material quoted £27 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—In moderate demand and prices rather higher at 8d. per lb., ex store. Offered for forward delivery at 7¾d. per lb., ex wharf.

POTASSIUM PRUSSIATE, YELLOW.—In rather better demand. Spot material now quoted 7¾d. per lb., ex store. Offered for prompt shipment from the Continent at 7½d. per lb., ex wharf.

SODA CAUSTIC.—76/77%, £18 per ton; 70/72%, £16 12s. 6d. per ton; broken 60%, £17 2s. 6d. per ton; powdered 98/99%, £21 7s. 6d. per ton. All carriage paid U.K. stations, spot delivery. Contracts 20s. per ton less.

SODIUM ACETATE.—Quoted £18 15s. per ton, ex store, spot delivery. On offer from the Continent at about £17 15s. per ton c.i.f. U.K. ports.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station. M.W. quality, 30s. per ton less.

SODIUM CARBONATE, SODA CRYSTALS.—£5 to £5 5s. per ton, ex quay or station. Powdered or pea quality, £1 7s. 6d. per ton more. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material unchanged at £9 10s. per ton, ex station, minimum 4 ton lots. Pea crystals, £14 per ton, ex station. Continental quoted £9 10s. per ton, ex store.

SODIUM NITRATE.—Quoted £13 per ton, ex store. 96/98% refined quality, 7s. 6d. per ton extra.

SODIUM NITRITE 100%.—Quoted £24 per ton, ex store. Offered from the Continent at about £22 5s. per ton c.i.f. U.K. ports.

SODIUM PRUSSIATE, YELLOW.—Spot material available at 4¼d. per lb., ex store. In moderate demand.

SODIUM SULPHATE, SALTCAKE.—Price for home consumption, £3 10s. per ton f.o.r. works. Good inquiry for export and higher prices obtainable.

SODIUM SULPHIDE.—English material. Solid, 60/62%, now £13 per ton; broken, £14 per ton; flake, £15 per ton; crystals, £8 10s. per ton, carriage paid U.K. stations, minimum 4 ton lots with slight reductions for contracts to the end of the year. 60/62% Solid offered from the Continent at £10 15s. per ton c.i.f. U.K. ports; broken, £1 per ton more. 30/32% crystals, £7 15s. per ton c.i.f. U.K. ports.

SULPHUR.—Flowers, £10 10s.; roll, £9 10s.; rock, £9 7s. 6d.; ground, £9 10s., per ton, ex store, spot delivery. Prices nominal.

ZINC CHLORIDE.—98/100% quoted from the Continent at £24 5s. per ton c.i.f. U.K. ports. 97/98% of English manufacture on offer at £25 per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Fine white crystals quoted £12 10s. per ton c.i.f. U.K. ports.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ORTHO TOLUIDINE.—8d. per lb. Good home and export inquiries.

BENZALDEHYDE.—2s. 1½d. per lb. Fair home inquiries.

DIMETHYLANILINE.—2s. 1d. per lb. Some home inquiries.

Metal Discs Wanted

BRITISH MONOMARKS, LTD., of 19, Abingdon Street, London, S.W.1, are inviting tenders for several millions of small identity discs to serve as Monomark tags. These should be (preferably) of white metal, and suitable for attachment to bags, umbrellas, keys, etc. Manufacturers should submit tenders immediately.

Manchester Chemical Market

[From Our Own Correspondent.]

Manchester, September 4, 1925.

Except in respect of one or two items, values on the Manchester chemical market during the past week have kept up pretty well, the weakness in the several lines referred to in my last report being less pronounced. Business, however, shows little or no increase over recent levels, most of the transactions reported being for moderate-sized parcels and, in the main, for prompt or near date delivery. This applies both to the home and the export branches of the trade.

Heavy Chemicals

Sulphide of sodium is maintained at last week's quotations of £12 5s. per ton for 60-65 per cent. concentrated solid, and round £9 5s. for commercial, with demand on rather narrow lines. Soda crystals are steady at about £5 5s. per ton, a moderate amount of business being done. Caustic soda is in fair request and values are firm at from £15 12s. 6d. per ton for 60 per cent. strength to £18 for 76-77 per cent. material. Bicarbonate of soda is still on offer at £10 10s. per ton, though the inquiry for this material is restricted. Saltcake is attracting limited attention, with quotations still round £3 12s. 6d. per ton. Glauber salts are a very dull section of the market, offers being made on the basis of £3 10s. per ton. Alkali is in fair request and values are steady at £6 15s. per ton. Hyposulphite of soda meets with a quietly steady demand and prices are about unchanged from last week at £14 10s. to £15 per ton for photographic crystals and round £9 for commercial quality. Prussiate of soda is steady and in moderate inquiry at about 4d. per lb. Chlorate of soda is selling slowly at 2⅞d. to 3d. per lb. The demand for bleaching powder is still restricted, but at £9 10s. per ton prices show no change. Acetate of soda is quiet at £18 per ton. Phosphate of soda is quoted at round £12 10s. per ton, but business is slow.

In bichromate of potash only a limited volume of trade is being done, though quotations are steady round 5d. per lb. Prussiate of potash is well held at 7d. to 7¼d. per lb. Caustic potash is steady at round £29 per ton, with the demand on a moderate scale. Carbonate of potash is firm and in fair request at £25 10s. to £26 per ton for 96–98 per cent. material. Chlorate of potash is quiet but steady at 3¾d. to 4d. per lb. Permanganate of potash is not particularly active, but values are about unchanged, pharmaceutical quality being quoted at 7¾d. and commercial at 6d. per lb.

No improvement in the position of arsenic has occurred and business for both sections of trade continues dull with prices weak; white powdered, Cornish makes, is quoted in Cornwall at £19 to £20 per ton, and at about £23 delivered in Manchester. Sulphate of copper is on the easy side at £24 to £24 10s. per ton, only a limited amount of buying interest being shown. Nitrate of lead is quiet, but values are firm at £41 to £42 per ton. White acetate of lead is steady at £44 to £45 per ton, with brown material quoted at round £41. Acetate of lime is not attracting much attention, but prices are maintained; grey is offered at about £14 5s. per ton and brown at £7 15s. to £8. Commercial Epsom salts are a rather quiet section, but values show no further weakness since last report, quotations being about £3 15s. per ton, with magnesium sulphate, B.P. quality, on offer at £5 5s. to £5 10s.

Acids and Coal Tar Products

Tartaric acid is in small demand and about unchanged at 11¾d. to 1s. per lb. Citric acid is quiet and easy at 1s. 3½d. to 1s. 4d. Oxalic acid continues inactive and weak at 3½d. per lb. Acetic acid is in quiet request and values are fairly steady at £38 per ton for 80 per cent. commercial and £67 for glacial.

Pitch is weak at about 38s. per ton, and demand is on a small scale. Business in naphthalene continues restricted and prices are easy at from £4 5s. per ton for crude material and round £13 10s. for refined. Solvent naphtha is on offer at about 1s. 6d. per gallon, and a quiet demand is being met with. Creosote oil keeps steady at 5¾d. per gallon. Carbolic acid is quiet but steadier at 4¾d. to 5d. per lb., with crude quoted at 1s. 6d. per gallon.

B. Laporte, Ltd.

Satisfactory Results and Business Expanding

The annual general meeting of B. Laporte, Ltd., was held at Luton on Wednesday, August 26, when Mr. H. E. Alcock, chairman and managing director, presented a very satisfactory report.

He referred to their labour troubles of last autumn, and said that these were all now satisfactorily ended, and the firm had voluntarily advanced the rates of pay of their men as soon as the position allowed it. He remarked that there was a growing tendency, especially among responsible British manufacturers, to buy British goods, although in some cases foreign goods produced by low-paid continental labour were temporarily of lower price. He hoped for a development of this spirit to the advancement of industry. The dividend of 11 per cent. was confirmed, and reference made to the continued expansion of the business. In some products Laporte's had set a new world standard.

Mr. H. Arnold was re-elected a director, and Messrs. L. P. O'Brien and I. E. Weber were elected to the board.

Increase of Capital

At a subsequent extraordinary general meeting a resolution was passed increasing the capital from £200,000 to £250,000 by 50,000 additional shares of £1 each, to be 7½ per cent. cumulative "B" preference shares of £1 each ranking *pari passu* in all respects with the existing "B" preference shares of the company and after the existing 6 per cent. preference shares in respect of dividend and priority of repayment in a winding-up, but not conferring on the holders thereof a right to any further participation in profits or assets. The chairman said that this increase was necessary to cope with continued expansion. The last issue of capital was one of £44,000 in 1923. Shareholders would be interested to know that whereas the issued capital before that date was £136,000, that additional capital of £44,000 enabled the output at the Kingsway works to be doubled, and prices to be reduced. In the last two years their prices had fallen 30 per cent. owing to the reduction of costs by increased output. It was only by pursuing such a policy that they were able to hold their position. As would be seen from the balance sheet, they were not short of cash, but there was a considerable amount to be done in the way of installing labour-saving appliances and developing new processes. The chairman said that probably about half of the new capital authorised would be offered for subscription in October. The resolution would be submitted for confirmation at a further extraordinary general meeting at Kingsway Works on September 11.

Artificial Silk Duties

At a meeting of the Silk Advisory Committee at Manchester last week a statement was issued concerning the payment of drawbacks of duties on artificial silk. The Committee decided that the only method was to define a rigid date, and after examination of stocks had been made the exhaustion date agreed was Saturday, November 14. Those firms who accept the date will, of course, be unable to secure any drawbacks on shipments made prior to November 16, whether the artificial silk contents has paid duty or not; but, on the other hand, drawback will be paid on all goods containing artificial silk despatched from the warehouse or packers on and after November 16.

The condition imposed by the Commissioners as to their acceptance of this date is that it should be adopted by the majority of the exporters in the trade.

The Committee have had before them a notice issued by the Commissioners of Customs and Excise explaining the procedure to be followed by any exporter who wished to take advantage of the "through ticket" scheme. Under this the Commissioners are empowered to allow the delivery, without payment of duty, of artificial silk either imported or home production intended for exportation. The result would be that such artificial silk would pass from the producer to the final consumer without either duties or drawbacks being paid.

The Committee's statement also brought before the notice of merchants that the Commissioners of Customs and Excise were prepared to consider requests by merchants for the assessment of drawbacks upon exported made-up goods containing silk or artificial silk at fixed rates.

Company News

BARRY, OSTLERE AND SHEPHERD.—An interim dividend of 5 per cent. is announced on the ordinary shares.

ASBESTOS CORPORATION OF CANADA.—The directors have declared a dividend of 1½ per cent. on the common and preferred stock, payable on October 15.

DOMINION TAR AND CHEMICAL CO., LTD.—The directors have authorised the payment, on or before September 16, of an interim dividend for the year 1925 of 5½ per cent., subject to tax, on the ordinary share capital.

WEBB'S CRYSTAL GLASS CO.—At an extraordinary general meeting of the company, and also at separate general meetings of the cumulative participating preference shareholders and of the ordinary shareholders, held on Tuesday, resolutions were carried approving the proposed scheme for reducing the capital of the company from £750,000 to £187,500.

F. STEINER AND CO.—After deducting £64,879 for repairs and depreciation, the profits for the past year were £33,138, which, with £40,848 brought forward, and a transfer from general reserve of £30,000, makes a surplus of £103,987. A dividend of 5 per cent. on the ordinary shares is proposed, carrying forward £39,737. For 1923–24 7½ per cent. was paid.

AMERICAN CYANAMID CO.—The accounts for the year to June 30 last show that surplus at June 30, 1924, was $1,039,267.64, which with the net income for the year, excluding losses of subsidiary companies, $1,149,904.13, makes a total of $2,189,171.77. After deducting sundry charges less credits for period prior to July 1, 1924, $22,683.58; losses on disposal and abandonment of equipment, $7,844.51; reduction of investment in Amalgamated Phosphate Co., $500,000.00; and dividends on preferred, $335,754.00; common, $395,658.00, leaves a surplus as at June 30, 1925, $927,231.68. The report states that claim of the Government for additional taxes, referred to in previous report, still remains undetermined. The subsidiary companies show net losses, after allowing for income taxes, of $58,071.65, due to the substantial amount of development work in which they are engaged.

BRITISH GLUES AND CHEMICALS, LTD.—In their report for the year ended May 31 last, the directors state that exact figures of the company's excess profits duty, corporation profits tax and income tax were finally agreed with the revenue authorities, and the provision made in last year's accounts proved to be more than adequate. The balance on profit and loss account brought forward from the last year amounted to £8,763, and the net profit for the past year, after due allowance has been made for depreciation (£30,437) and bad and doubtful debts, was £42,540 (against £6,293 last year), making a total of £51,303. Deducting £2,533, provision for taxation to May 31, 1925, there remains £48,770. It is proposed to pay on September 29, 1925, the dividend, less tax, on the 8 per cent. cumulative preference shares for the half-year ended April 1, 1922, which will absorb £15,312, leaving to be carried forward £33,458. The annual meeting will be held at Cannon Street Hotel, London, on September 9, at 12 noon.

Tariff Changes

BELGIUM.—A decree increases the Customs duties on cane and beet sugar (Tariff No. 235) and syrups of all kinds not specified in the Tariff (Tariff No. 238b) by applying a "coefficient" of 1·5 to the basic rates, which were formerly exempt from "coefficient." The effect of this decree is to increase the "minimum" tariff duty on cane and beet sugar from 40 to 60 frs. per 100 kilogs. and that on unspecified syrups from 30 to 45 frs. per 100 kilogs.

ITALY.—A decree abolishes the manufacturing tax on soaps, lyes, and lye wash as from August 1.

NORWAY.—An export tax is to be imposed on cod liver oil.

Glycerin Production in Russia

THE production of glycerin in Russia is announced. The Proletary Shop Factory has recommenced production. The annual output of glycerin is estimated at 20,000 kilogrammes.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.

Opposition to the Registration of the following Trade Marks can be lodged up to October 2, 1925.

"SECCON."

461,046. For a chemical compound to be used as a dressing for concrete or other similar surfaces to render them waterproof. William Edward Woodward, 66, Glisson Road, Cambridge; university lecturer. July 30, 1925.

"DRONAMIN."

452,522. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler (a company incorporated under the laws of Prussia), Weissfrauenstrasse 7 and 9, Frankfurt a/M, Germany; chemical manufacturers. October 8, 1924. (To be Associated. Sec. 24.)

"FRACASTAN."

452,524. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler (a company incorporated under the laws of Prussia), Weissfrauenstrasse 7 and 9, Frankfurt a/M, Germany; chemical manufacturers. October 8, 1924. (To be Associated. Sect. 24.)

"FRACASTAN."

452,525. For chemical substances prepared for use in medicine and pharmacy. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler (a company incorporated under the laws of Prussia), Weissfrauenstrasse 7 and 9, Frankfurt a/M, Germany; chemical manufacturers. October 8, 1924.

"SANITAS-SOLDIS."

459,997. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. The "Sanitas" Co., Ltd., Locksley Street, Limehouse, London, E.14; manufacturers. June 23, 1925. (To be Associated. Sect. 24.)

"DRONAMIN."

452,523. For chemical substances prepared for use in medicine and pharmacy. Deutsche Gold-und Silber-Scheideanstalt vorm. Roessler (a company incorporated under the laws of Prussia), Weissfrauenstrasse 7 and 9, Frankfurt a/M, Germany; chemical manufacturers. October 8, 1924. (To be Associated. Sect. 24.)

Chevreul Commemorations in Paris

IN connection with the Fifth Congress of the French Society of Chemical Industry to be held in Paris during October, *Nature* states (as already briefly announced) that a special assembly will commemorate, on October 11, the one hundredth anniversary of the practical establishment of the soap industry by the French chemist, Michel Eugène Chevreul, who, in 1825, with J. L. Gay-Lussac, started a factory for the manufacture of stearic acid. Through his prolonged scientific researches Chevreul explained the process of saponification. The President of the French Republic, members of the Academy of Sciences, and those of kindred bodies will join in the forthcoming commemorative session. Born at Angers on August 31, 1786, Chevreul died in 1889, at the age of one hundred and three years. At seventeen Chevreul went to Paris, entering Vauquelin's chemical manufactory; ultimately he became director there of the laboratory. Later (1824) he took up the post of Director of the Dyeing Department and professor of dyeing at the tapestry works of the Gobelins. His well-known researches on the principles of harmony and contrast of colours were carried out at this period. In 1864 Chevreul was appointed Director of the Museum at the Jardin des Plantes, retiring in 1879. Elected a foreign member of the Royal Society in 1826, Chevreul was awarded the Copley Medal in 1857. The centenary of the birth of this distinguished chemist was celebrated in Paris with signal honour and many felicitous demonstrations. A great procession to the cathedral of Notre Dame took place on the occasion of Chevreul's funeral in 1889.

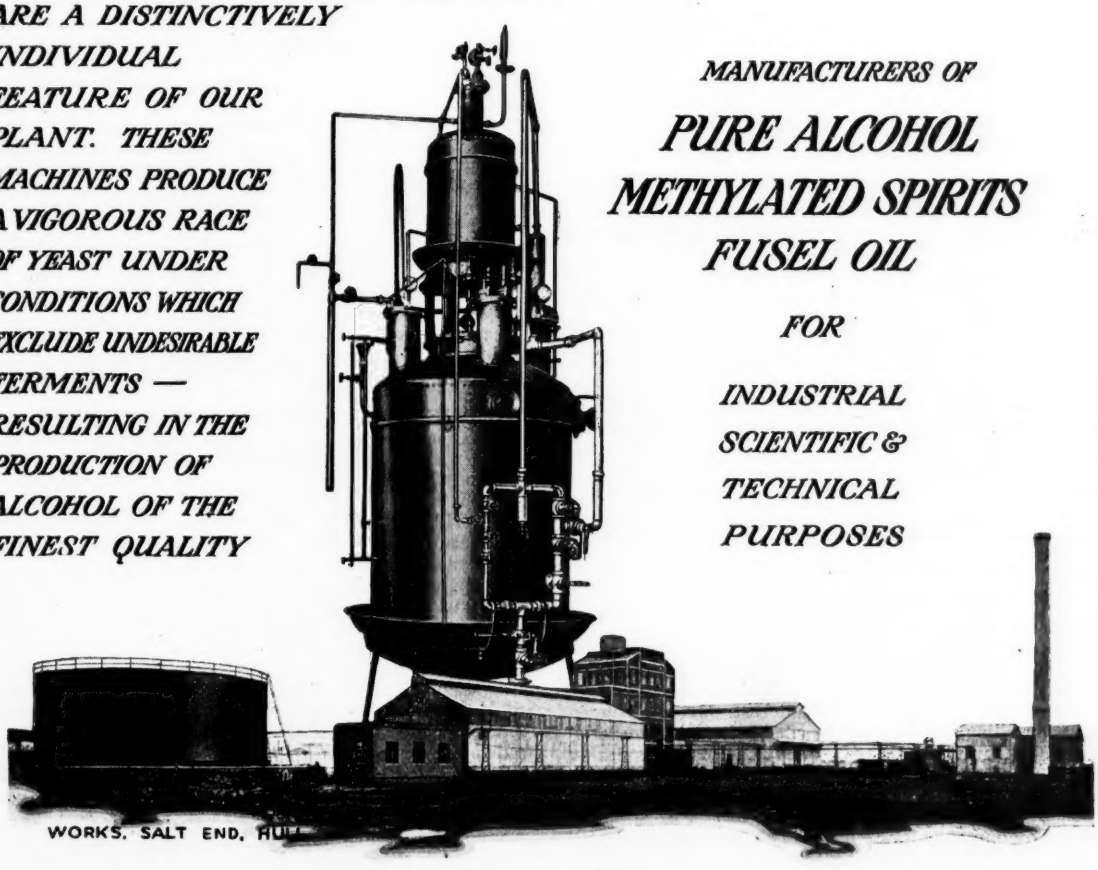
INDUSTRIAL ALCOHOL AND ALLIED CHEMICALS

Direct Producers

HERBERT GREEN & Co LTD

Licensed Distillers

PURE YEAST CULTURE MACHINES ARE A DISTINCTIVELY INDIVIDUAL FEATURE OF OUR PLANT. THESE MACHINES PRODUCE A VIGOROUS RACE OF YEAST UNDER CONDITIONS WHICH EXCLUDE UNDESIRABLE FERMENTS — RESULTING IN THE PRODUCTION OF ALCOHOL OF THE FINEST QUALITY



WORKS, SALT END, HULL

MANUFACTURERS OF

PURE ALCOHOL
METHYLATED SPIRITS
FUSEL OIL

FOR

INDUSTRIAL
SCIENTIFIC &
TECHNICAL
PURPOSES

Head Office

50 PALL MALL, LONDON, S.W.1

HERBERT GREEN, *Managing Director*

Telegrams: "INDUSTALCO LONDON" *Telephone:* REGENT 7474

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

ARTIFICIAL SILKS.—A Melbourne business man is desirous of getting into touch with British manufacturers of artificial silks. He will be returning to England on September 13. Replies should be addressed, in the first instance, to the Official Secretary, Commercial Bureau, Australia House, Strand, W.C.2. (Reference No. 412/7/1/1/331.)

DRUGS AND CHEMICALS.—The D.O.T. has been notified that a merchant firm in Czernowitz at present importing from central European countries has expressed a desire to enter into business relations with British manufacturers of drugs and chemicals. (Reference No. 257.)

CHEMICALS, SOAP, AND ARTIFICIAL RESIN.—An agent in Vienna desires to represent British manufacturers of the above. (Reference No. 238.)

DRY COLOURS.—A manufacturers' agent in Toronto desires to represent British manufacturers of dry colours for the province of Ontario. (Reference No. 235.)

SULPHATE OF COPPER.—The Postmaster-General's Department, Melbourne, are calling for tenders to be presented by October 6 for sulphate of copper. Schedule and general conditions of tender are available for inspection. (Reference No. B.X. 2002.)

RED OXIDE PAINT.—The Administration of the South African Railways and Harbours is inviting tenders for the supply of red oxide paint in paste as required during the period January 1, 1926, to June 30, 1926. Further particulars from the D.O.T. (Reference B.X. 2005.)

SOAP.—The Administration of the South African Railways and Harbours is inviting tenders for the supply of soap as required during the period January 1, 1926, to June 30, 1926 Further particulars from the D.O.T. (Reference B.X. 2006.)

PARAFFIN OIL FOR S. AFRICA.—The Administration of the South African Railways and Harbours is inviting tenders for the supply of paraffin oil as required during the period January 1, 1926, to June 30, 1926. Tenders to be presented in South Africa by November 12. Further particulars from the D.O.T. (Reference B.X. 2004.)

HAND FIRE EXTINGUISHERS.—The Monopoly Administration (Belgrade) desires to receive tenders for supply of 223 hand fire extinguishers by September 23. Further particulars from the D.O.T. (Reference B.X. 2014.)

COCONUT AND SOYA BEAN OILS.—A firm of commission agents in Oslo desires to represent a British refinery of the above oils for use in the margarine industry. (Reference No. 285.)

Drum Filling by Machinery

THE filling of drums by machinery is a process that will commend itself to all firms anxious to adopt the most efficient methods. In this connection the "Jackson" horizontal drum filling machine, made by J. G. Jackson and Co., 50, Wellington Street, Glasgow, is of interest. It is designed primarily for filling drums with powder, where the material has to be filled through a bung-hole. It can also be suitably used on large bottles and like containers. The machine automatically disengages when filling is completed, and alteration in the quantity to be packed can be secured by altering the amount of back-weight. The firm will be pleased to forward details to all interested.

Cement Developments in Australia

Two Australian companies have recently ordered cement machinery from a Sheffield firm. The Sulphide Corporation, Ltd., Cockle Street, N.S.W., has already in operation the first of a three-unit rotary kiln plant with a total capacity of 90,000 tons per annum. The Standard Portland Cement Co.'s plant at Kandos-Coomber, near Wallerawang, N.S.W., now being manufactured, is designed to operate on the dry process. It will have a capacity of 100,000 tons.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette, &c.

Companies Winding Up Voluntarily

MANCHESTER OIL REFINERIES, LTD. (C.W.U.V., 5/9/25.) Roger N. Carter, 16, Kennedy Street, Manchester, chartered accountant, appointed liquidator August 20. Meeting of creditors at the liquidator's office, Tuesday, September 8, at 11 a.m.

HAMPSHIRE PETROLEUM CO., LTD. (C.W.U.V., 5/9/25.) C. J. H. Jones appointed liquidator. Meeting of creditors, 45, Pearl Buildings, Portsmouth, September 8, at 4.30 p.m.

METHLEY CHEMICAL CO., LTD. Meeting of creditors at the Leeds Law Institute, 1, Albion Place, Leeds, on Wednesday, September 2, at 3 p.m.

RIDLEY AND WILLIAMSON CHEMICAL CO., LTD. Meeting of creditors at 5, Essex Place, Rodney Road, Cheltenham, on Friday, September 4, at 4.30 p.m.

New Companies Registered

AFRICAN EXPLOSIVES AND INDUSTRIES, LTD. Manufacturers of and dealers in explosives, gun and blasting powders, manufacturers of ammunition and chemicals, etc. Nominal capital, £2,200,000 in £1 shares. The company was incorporated in the Cape Province on March 21, 1924. The British address is:—3, Buckingham Gate, London, S.W.1.

BRITISH COLOUR AND MINING, LTD., 19, Victoria Buildings, Victoria Street, Manchester. To acquire any iron, colour, coal and other mines and stone quarries, mining rights and properties in the United Kingdom or elsewhere. Nominal capital, £22,000 in 20,000 8 per cent. cumulative preference shares of £1 each and 40,000 ordinary shares of 1s. each.

BRITISH PYROS WHITE LEAD CO., LTD. To acquire from the Pyros Chemical and Engineering Co., Ltd., all its interests in the rights in Great Britain in an invention or process for the production of sulphate white lead, together with plant, machinery, and apparatus to be used in such production, etc. Nominal capital, £10,000 in 8,500 7 per cent. cumulative preference shares of £1 and 30,000 ordinary shares of 1s. each.

THOMAS CHALMERS AND SONS (1925), LTD., Lochmill, Linlithgow. Manufacturers of paper and pulp and articles made of and from paper, pulp, etc. Nominal capital, £45,000 in 20,000 8 per cent. preference shares of £1 and 25,000 ordinary shares of £1.

KATHIJAX, LTD., 109, Kingsway, London. Chemical manufacturers and dealers, chemists, druggists, drysalters, etc. Nominal capital, £1,000 in £1 shares.

R. M. LINDSAY (DUNDEE), LTD. Wholesale, retail, manufacturing and dispensing chemists and druggists, drysalters, etc. Nominal capital, £800 in £1 shares. Solicitor: J. Simpson, 12, Bank Street, Dundee.

LUCLANE MANUFACTURING CO., LTD. Importers, refiners, and blenders of oils of all kinds; manufacturers of and dealers in oils, grease, soap, tallow, glycerine, etc. Nominal capital, £2,000 in £1 shares. Solicitor: R. E. Perrins, 1, Frederick Street, Llanelly.

WILLIAMS (HOUNSLOW), LTD., 179, Hanworth Road, Hounslow. Manufacturers of and dealers in aniline dyes and chemicals. Nominal capital, £200,000 in £1 shares.

Work Among the Blind

THE National Institute for the Blind has just issued its annual report for 1924–25—a comprehensive survey in itself of the remarkable advancement in the training of the blind. Reference is made, among other things, to the success of blind telephone operators and typists, and to the increasing numbers of qualified blind craftsmen and operators. The records of the various phases of activity are so remarkable as to make the report worthy of the practical sympathy of all. The work is a vital and a national work, and its importance needs no qualification. It deserves to command support.